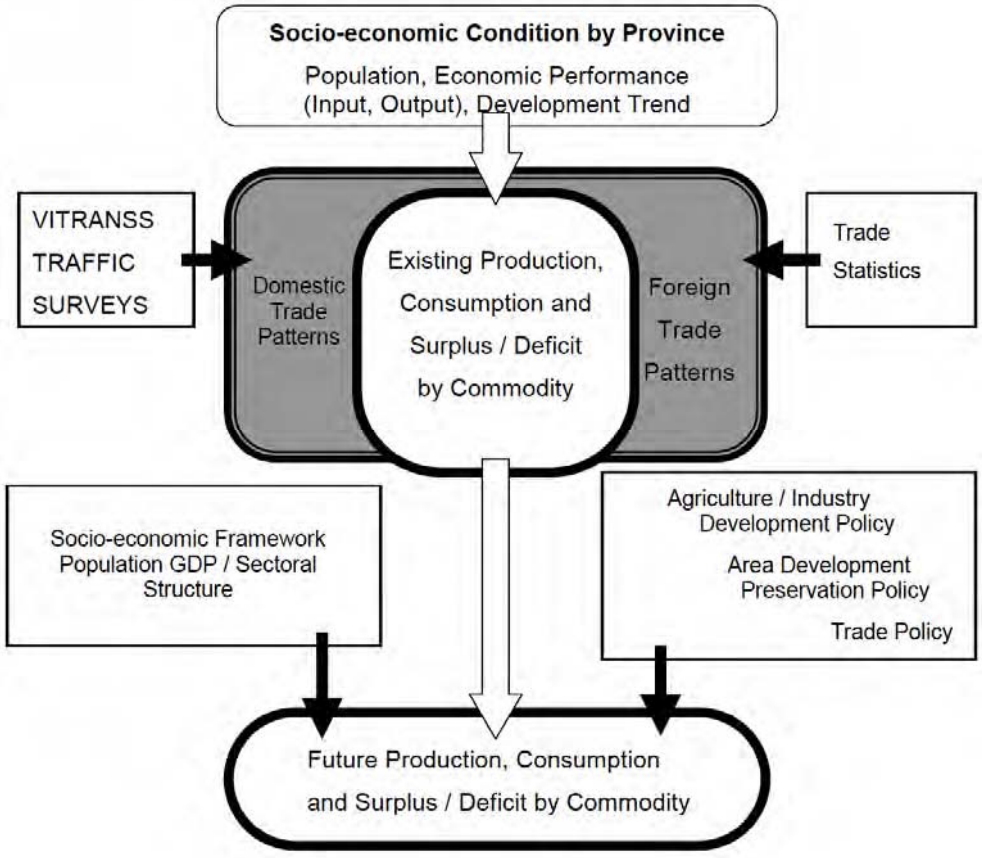
5.4 Freight Transportation Demand

1) Methodology

5.25 The freight transportation plan is to be based on the analysis of major commodities in view of volume and direction. In VITRANSS 1, major commodities were classified into 13 groups. This study adopts the same classification and also generally follows the steps taken in VITRANSS 1 for cargo demand forecast and analysis.

5.26 The first step taken to forecast freight transportation demand was to estimate production and consumption by province and by commodity group. The province-wise surplus or deficit is usually considered the source of freight traffic. This forecast was done based on VITRANSS 2 transportation surveys and existing trade statistics. Socio-economic growth trends and proposed/planned development projects were taken into account as well.

Figure 5.4.1 Forecast of Production/Consumption and Surplus/Deficit by Commodity



Source: VITRANSS 2 Study Team.

5.27 After this forecast, the usual four-step method was applied in the same manner as forecasting passenger transportation demand. Trip generation/attraction model, trip distribution model, as well as the modal split model and assignment model are described in subsequent pages together with the results.

Table 5.4.1 Commodity Classification Adopted in VITRANSS 2

Commodity Group	Composition of Commodity by Group
1. Rice	Rice, cereal, wheat
2. Sugar	Sugarcane for refining, sugar cane for chew, refined sugar
3. Wood	Wood for wooden furniture, wood for paper production
4. Industrial crops	Cash crops such as coffee, tea, rubber, pepper, sweet potatoes, soybeans, cashew nuts, coconut, tobacco, etc.
5. Fishery	Landed fish, farmed fish, aquatic products farmed and caught
6. Animal meat	Pig, cattle, poultry, et al
7. Finished steel	Finished steel of various kind including reinforcing bars
8. Construction material	Stone, gravel, sand, bricks, tiles et al
9. Cement	Cement
10. Fertilizer	Fertilizer, animal feed
11. Coal	Coal for power, coal for fertilizer production, coal for industries
12. Petroleum	Petroleum products (excluding crude oil)
13. Manufactured products	Manufactured goods, equipment, machinery, chemicals, consumable goods, etc. either containerized or non-containerized

Source: VITRANSS 2 Study Team.

2) Forecast Summary of Production/Consumption and Export/Import

5.28 Table 5.4.2 summarizes the forecasts on the production/consumption and import/export of major commodities. The commodity classification used in the table is not based on the 13-commodity grouping shown in Table 5.4.1; but it was later integrated into the 13-commodity grouping when they were used as input data for forecasting freight transportation demand (refer to Technical Report No.3 on transportation demand analysis and No.4 on major commodity analysis).

Table 5.4.2 Summary of Output/Consumption Volume of Major Commodities by Cargo Type

(000 tons)

Commodity	Gross Output (Million tons)				Import (Million tons)				Export (Million tons)				Consumption (Million tons)			
	1997	2010	2020	2030	1997	2010	2020	2030	1997	2010	2020	2030	1997	2010	2020	2030
Total	167.3	561.5	916.9	1,357.6	17.4	54.3	130.6	322.2	22.1	66.2	96.8	175.6	178.0	580.5	997.9	1,564.9
Liquid Cargo	10.1	25.4	37.5	49.6	5.6	7.6	0.3	6.9	10.1	18.9	17.0	29.1	15.7	39.5	58.3	77.0
1 Petroleum	1 0.1	25.4	37.5	49.6	5.6	7.6	0.3	6.9	10.1	18.9	17.0	29.1	15.7	39.5	58.3	77.0
Dry Cargo	157.2	536.0	879.4	1,308.0	11.8	46.7	130.3	315.3	12.0	47.3	79.8	146.6	162.3	541.0	939.7	1,487.9
Industrial Products	82.7	400.9	657.7	999.8	10.1	39.0	111.3	287.0	7.0	38.6	60.3	117.3	85.7	401.5	709.3	1,171.3
1 Const'n Mat'ls	53.5	244.2	407.1	570.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	53.5	244.2	407.1	570.1
2 Coal	11.4	47.0	50.0	50.0	0.0	0.0	30.3	127.5	3.5	12.0	0.0	0.0	7.9	35.2	80.9	178.5
3 Cement	8.0	53.1	70.0	102.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	8.0	53.1	70.0	103.6
4 Fertilizer	3.2	8.7	12.8	15.8	2.7	3.3	2.6	3.2	0.0	0.0	0.0	0.0	5.9	12.0	15.4	19.0
5 Finished Steel	1.0	11.0	20.0	30.0	0.8	1.0	0.0	0.0	0.0	0.0	0.0	0.0	1.8	12.0	20.0	30.0
6 Mfg. Goods (Out)	5.5	36.9	97.7	231.1	0.0	0.0	0.0	0.0	3.6	26.6	60.3	117.3	1.9	10.2	37.4	113.8
7 Mfg. Goods (In)	0.0	0.0	0.0	0.0	6.7	34.7	78.4	156.3	0.0	0.0	0.0	0.0	6.7	34.7	78.4	156.3
Mining Products	1.0	6.4	23.4	45.5	0.0	0.0	0.0	0.0	0.4	0.9	9.5	17.0	1.4	7.2	32.9	62.5
1 Iron Ore	0.4	3.5	16.0	28.7	0.0	0.0	0.0	0.0	0.4	0.9	9.5	17.0	0.8	4.3	25.5	45.7
2 Bauxite	0.0	1.7	5.6	14.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.7	5.6	14.4
3 Apatite	0.6	1.3	1.8	2.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.6	1.3	1.8	2.4
Agri'l Products	73.6	128.8	198.3	262.7	1.7	7.7	19.0	28.3	4.6	7.8	10.0	12.3	75.2	132.2	197.4	254.1
1 Cereal	29.2	46.7	64.1	84.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	29.2	46.7	64.1	84.2
2 Wheat	0.0	0.0	0.0	0.0	0.4	1.4	2.3	3.4	0.0	0.0	0.0	0.0	0.4	1.4	2.3	3.4
3 Rice	20.6	31.8	39.7	49.1	0.0	0.0	0.0	0.0	3.6	4.0	4.0	4.0	20.6	31.8	39.7	49.1
4 Sugar	12.7	22.7	38.4	48.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	12.7	22.7	38.4	39.2
5 Fishery Products	3.2	8.7	14.3	20.9	0.0	0.0	0.0	0.0	0.1	0.4	0.6	0.8	3.2	8.7	14.3	20.9
6 Wood	1.3	6.3	23.4	34.8	1.3	6.3	16.7	24.9	0.0	0.0	0.0	0.0	2.5	8.4	20.3	32.0
7 Animal Meat	1.5	2.7	3.9	5.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.5	2.7	3.9	5.2
8 Cassava	0.5	1.7	2.9	3.6	0.0	0.0	0.0	0.0	0.1	1.0	1.7	2.4	0.5	1.7	2.9	4.2
9 Coffee	0.5	1.3	1.7	2.4	0.0	0.0	0.0	0.0	0.4	1.1	1.5	2.0	0.5	1.3	1.7	2.4
10 Tea	0.2	0.8	1.3	1.9	0.0	0.0	0.0	0.0	0.0	0.1	0.2	0.3	0.2	0.8	1.3	1.9
11 Rubber	0.2	0.8	1.3	1.8	0.0	0.0	0.0	0.0	0.2	0.8	1.3	1.8	0.2	0.8	1.3	1.8
12 Pepper	0.0	0.2	0.2	0.3	0.0	0.0	0.0	0.0	0.0	0.2	0.2	0.3	0.0	0.2	0.2	0.3
13 Cashew	0.0	0.2	0.3	0.5	0.0	0.0	0.0	0.0	0.0	0.2	0.3	0.4	0.0	0.2	0.4	0.5
14 Sweet Potato	1.7	1.5	1.6	1.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.7	1.5	1.6	1.9
15 Soybean	0.2	0.5	0.6	0.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.5	0.6	0.7
16 Coconut	0.3	0.2	0.5	1.1	0.0	0.0	0.0	0.0	0.0	0.1	0.2	0.3	0.3	0.2	0.5	1.2
17 Animal Meat	1.5	2.7	3.9	5.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.5	2.7	3.9	5.2
Container (mil. tons)					3.7	28.3	63.3	133.7	3.2	22.2	48.8	103.4	6.9	50.5	112.1	237.1
Container (000 TEU)					0.4	2.7	6.0	12.7	0.3	2.4	5.3	11.2	0.7	5.1	11.3	23.9

Source: VITRANSS 2 Study Team.

5.29 Table 5.4.3 summarizes the forecast of export/import in Vietnam. For details, refer also to the Technical Report No. 4.

Table 5.4.3 Export/Import Forecast in Vietnam

Commodity	Import (Million tons)				Export (Million tons)				Major Port	
	1997	2010	2020	2030	1997	2010	2020	2030	Loading	Unloading
1. Petroleum	5.60	7.58	0.26	6.93	10.09	18.94	17.00	29.06	Off Ba Ria Vung Tau (Crude Oil)	Quang Ninh, Da Nang, Ba Ria Vung Tau
2. Coal	0.00	0.00	30.32	127.50	3.45	12.00	0.00	0.00	Quanh Ninh	Various area of coal fired thermal power stations
3. Fertilizer	2.66	3.29	2.58	3.20						Hai Phong, Da Nang, Ba Ria Vung Tau
4. Finished Steel	0.81	1.00	0.00	0.00					Cao Bang, Bac Kan, Lao Cai, Thai Nguyen,	Hai Phong, Da Nang, Ba Ria Vung Tau
5. Manufacturing Goods (Out)					3.59	26.63	60.29	117.29	Ha Noi, Hai Phong, Thanh Hoa, Dong Nai, Ba Ria Vung Tau, Ho Chi Minh	
6. Manufacturing Goods (In)	6.66	34.74	78.40	156.31						Hai Phong, Quang Ninh, Da Nang, Binh Dinh, Ba Ria Vung Tau, Ho Chi Minh City
7. Iron Ore					0.40	0.85	9.50	17.01	Thai Nguyen, Bac Kan, Ha Gian	
8. Wheat	0.40	1.37	2.30	3.42	0.00	0.00	0.00	0.00		Quang Ninh, Ba Ria Vung Tau,
9. Rice					3.58	4.00	4.00	4.00	Long An, Tien Giang, Dong Thap, An Giang, Kien Giang, Can Tho	Hai Phong, Da Nang, Ba Ria Vung Tau
10. Fiishery Products					0.15	0.36	0.57	0.78	Binh Thuan, Ba Ria Vung Tau, Long An, An Giang, Kien Giang, Ca Mau	
11. Wood	1.27	6.30	16.71	24.86						Hai Phong, Da Nang, Ho Chi Minh
12. Industrial Crops	0.00	0.00	0.00	0.00	0.83	3.47	5.42	7.49		Ninh Binh, Thanh Hoa, Nghe An, Quang Nam, Binh Dinh, Tay Ninh, Da Nang, Ba Ria Vung Tau, Ho Chi Minh City
13. Container	3.68	28.31	63.31	133.68	3.22	22.15	48.80	103.42	Hai Phong, Quang Ninh, Da Nang, Binh Dinh, Ba Ria Vung Tau, Ho Chi Minh City	

Source: VITRANSS 2 Study Team.

3) Generation/Attraction: Domestic Movement

5.30 The following assumptions were introduced to forecast domestic freight transportation demand:

(i) If a province has much surplus (i.e., production is higher than consumption), it will generate more freight, or if a province has much deficit (i.e., consumption is higher than production), it will attract more freight;

(ii) More freight is generated by and attracted to a province with an adequate logistics infrastructure or delivery system. Usually, leading cities, such as Hanoi and Hai Phong, have good logistics infrastructure; and a lot of freight is delivered to the final destination via such cities. For this reason, socio-economic indicators were also used as exogenous variables; and

(iii) Export is regarded as consumption and import as production. Therefore, provinces with international ports will generate and attract more traffic.

5.31 Based on the above assumptions, multiple linear regression models were developed as follows:

$$Gi = a1 * Si + a2 * Xi + b$$
$$Aj = c1 * Dj + c2 * Xj + d$$

Where, Gi: Generation from Zone i
Aj: Attraction to Zone j
Si: Surplus in Zone i
Dj: Deficit in Zone j
Xi, Xj: Socio-economic indicator of Zone i&j
a1, a2, c1 and c2: Parameters
c and d: Constant

5.32 Using the socio-economic indicators in the equation above as explanatory variables, the total GRDP or sectoral GRDP that showed the strongest correlation was taken. In addition, the same indicators were used both for generation and attraction to avoid a possible imbalance in growth rates between the two. Export/Import was included in the generation/attraction of port provinces.

Table 5.4.4 Variables Used in the Regression Analysis

Commodity	Generation	Attraction
1. Paddy and Other Crops	Surplus, Tertiary GRDP	Tertiary GRDP
2. Sugar/Sugarcane	Surplus, GRDP	GRDP
3. Wood and Forest Products	Secondary GRDP	Deficit, Secondary GRDP
4. Steel	Surplus, Tertiary GRDP	Tertiary GRDP
5. Construction Materials	Surplus, Tertiary GRDP	Tertiary GRDP
6. Cement	Surplus, Tertiary GRDP	Tertiary GRDP
7. Fertilizer	Tertiary GRDP	Deficit, Tertiary GRDP
8. Coal	Surplus, Tertiary GRDP	Deficit, Tertiary GRDP
9. Petroleum Products	GRDP	Deficit, GRDP
10. Industrial Crops	Surplus, Tertiary GRDP	Deficit, Tertiary GRDP
11. Manufacturing Goods	Secondary GRDP	Secondary GRDP
12. Fishery Products	Surplus, GRDP	GRDP
13. Animal Meat and Others	GRDP	GRDP

Source: VITRANSS 2 Study Team.

Table 5.4.5 Estimated Coefficients

Commodity	Production/Attraction	Constant	a1/c1	a2/c2
1. Paddy and Other Crops	Production	1,063.7	0.55	0.30
	Attraction	638.0		0.44
2. Sugar/Sugarcane	Production	107.2	0.13	0.00
	Attraction	-128.2		0.04
3. Wood and Forest Products	Production	313.2		0.03
	Attraction	387.7	1.68	0.00
4. Steel	Production	399.2	0.83	0.12
	Attraction	321.5		0.14
5. Construction Materials	Production	4,301.1	0.87	1.23
	Attraction	4,325.9		1.22
6. Cement	Production	619.4	2.98	0.49
	Attraction	929.5		0.38
7. Fertilizer	Production	-149.9		0.27
	Attraction	568.7	0.23	0.03
8. Coal	Production	1,727.5	7.66	0.09
	Attraction	1,405.4	0.23	0.19
9. Petroleum Products	Production	-707.2		0.22
	Attraction	326.6	0.13	0.07
10. Industrial Crops	Production	105.3	0.22	0.01
	Attraction	13.3	0.62	0.04
11. Manufacturing Goods	Production	737.9		0.84
	Attraction	496.7		0.93
12. Fishery Products	Production	-286.0	0.71	0.08
	Attraction	212.3		0.01
13. Animal Meat and Others	Production	273.3		0.17
	Attraction	537.2		0.13

Source: VITRANSS 2 Study Team.

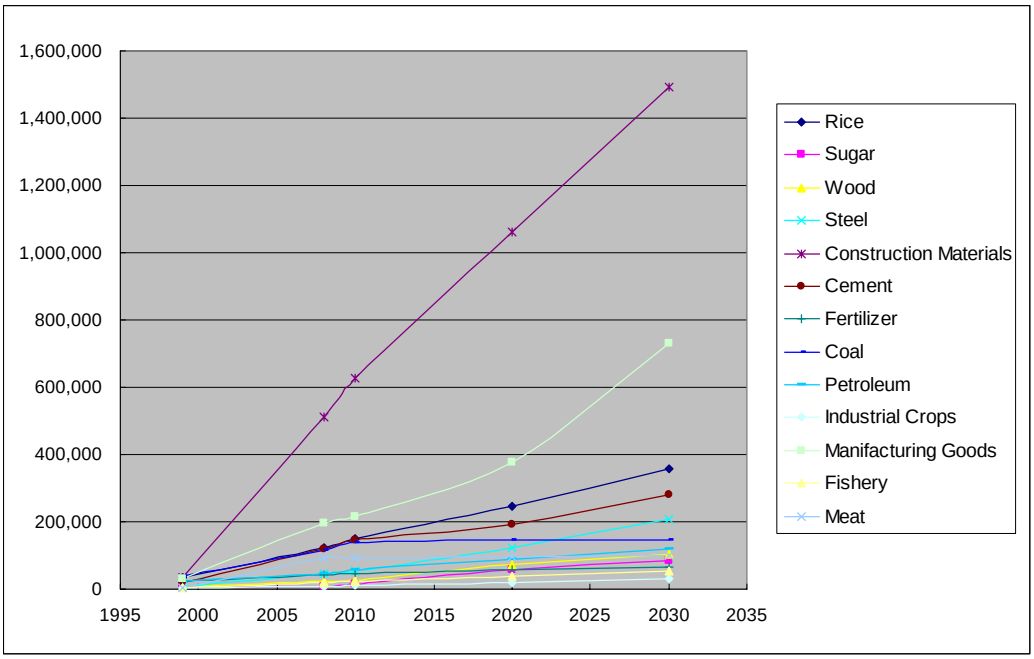
5.33 The calculated values were then adjusted to the projected gross output (control total), and the results are shown below.

Table 5.4.6 Estimated Generation/Attraction of Commodities

Commodity	Generation/Attraction by Commodity (ton/day)					Annual Growth Rate (%)		
	1999	2008	2010	2020	2030	'08—'10	'10— '20	'20— '30
1. Rice	35,995	121,613	148,713	244,288	356,436	10.6	5.1	3.9
2. Sugar	6,464	8,617	14,744	56,585	83,982	30.8	14.4	4.0
3. Wood	6,881	24,619	27,703	73,132	103,460	6.1	10.2	3.5
4. Steel	6,924	45,900	54,935	122,652	206,311	9.4	8.4	5.3
5. Construction Materials	36,520	510,133	627,021	1,059,963	1,492,905	10.9	5.4	3.5
6. Cement	20,071	120,183	147,843	192,647	279,954	10.9	2.7	3.8
7. Fertilizer	24,042	41,598	44,967	55,871	63,779	4.0	2.2	1.3
8. Coal	39,548	117,124	138,959	146,930	146,930	8.9	0.6	0.0
9. Petroleum	22,652	47,030	56,444	88,486	120,528	9.6	4.6	3.1
10. Industrial Crops	4,176	8,043	10,165	19,222	29,989	12.4	6.6	4.5
11. Manufacturing Goods	30,416	194,481	213,704	375,424	729,767	4.8	5.8	6.9
12. Fishery	4,521	19,389	22,724	37,604	55,333	8.3	5.2	3.9
13. Meat	2,867	93,094	93,843	97,126	100,982	0.4	0.3	0.4
Total	241,077	1,351,824	1,601,766	2,569,930	3,770,356	8.9	4.8	3.9

Source: VITRANSS 2 (2008)

Figure 5.4.2 Estimated Generation/Attraction of Commodities

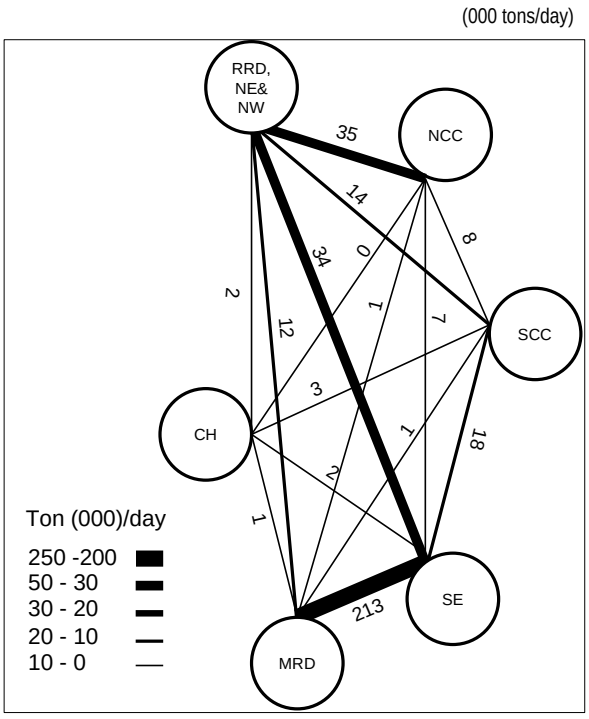


Source: VITRANSS 2 Study Team.

4) Distribution: Domestic Movement

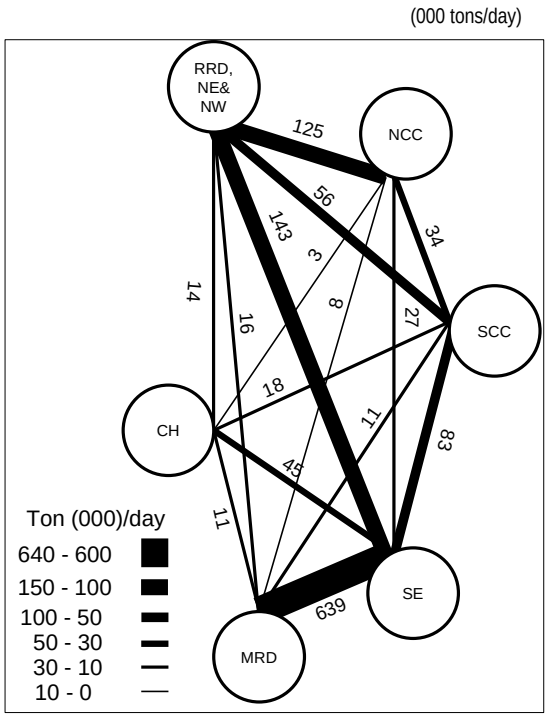
5.34 The Fratar method was used to forecast future OD distribution. Since this method tends to lead to large traffic flows at longer distances, the result was proportionally adjusted to have as its upper limit three (3) times the average transportation distance by commodity. In a province with no trip generation/attraction at present, expected trip generation and attraction were estimated separately before the Fratar balancing calculation. The results are presented below.

Figure 5.4.3 Freight Distribution in 2008



Source: VITRANSS 2 Study Team.

Figure 5.4.4 Freight Distribution by 2030



Source: VITRANSS 2 Study Team.

5) Modal Split Model

5.35 The modal split of freight traffic demand was estimated using the following formula:

$$Pij(Mk) = (1/GCij(Mk))2 / (1/GCij(M1))2 + (1/GCij(M2))2 + \cdots)$$

Where, M: mode
P: probability of selecting Mode k between zone I and j
GC: generalized cost of the Mode between zone I and j

5.36 Generalized cost is the sum of transportation cost and time cost of commodity (refer to Technical Report No. 3 on transportation demand forecast).

(1) Overall Modal Split

5.37 At present, inland waterways and roads handle the majority of freight in terms of tonnage with modal shares of over 40%. In terms of ton-kilometers, coastal shipping also shares a large percentage of nearly 30%. In the future, the modal shares of road, rail, and coastal shipping are projected to increase steadily, while inland waterway will gradually decrease.

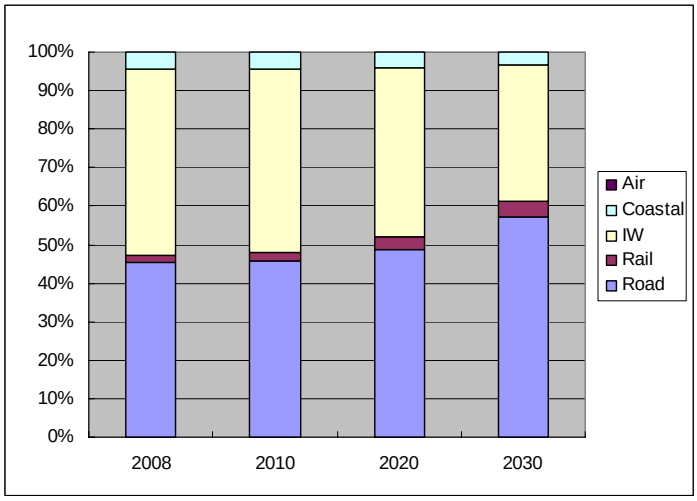
5.38 Modal preference differs by commodity. For instance, construction materials depend on inland waterways and roads, while manufacturing goods depend heavily on roads. Air transportation is used only for manufacturing goods.

Table 5.4.7 Modal Shares of Freight Transportation, 2008 and 2030

		Road	Rail	Inland Waterway	Coastal Shipping	Air	Total
Volume transported (000 ton/day)	2008	604.9	25.5	643.0	58.1	0.3	1,351.8
	2030	2,132.7	155.1	1,317.0	125.8	1.0	3,731.6
Modal share (%, ton)	2008	45.4	1.9	48.3	4.4	0.0	100.0
	2030	57.2	4.2	35.3	3.4	0.0	100.0
Modal share (%, ton-km)	2008	36.6	4.3	30.5	28.5	0.1	100.0
	2030	53.0	9.7	19.9	17.2	0.2	100.0

Source: VITRANSS 2 Study Team.

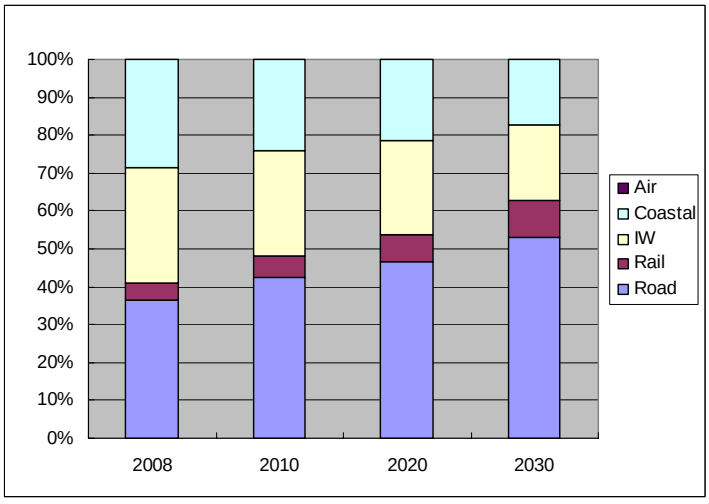
Figure 5.4.5 Trends in Modal Shares of Freight Transportation in Tons, 2008–2030



Source: VITRANSS 2 Study Team.

Figure 5.4.6 Trends in Modal Shares of Freight Transportation in Ton-Kilometers, 2008–2030

(ton)



Source: VITRANSS 2 Study Team.

(2) Modal Shares by Commodity

5.39 The tables below show the estimated modal shares of interprovincial freight transportation by commodity for the years 2008 and 2030.

Table 5.4.8 Modal Shares of Freight Transportation by Commodity, 2008

Commodity	Road	Rail	IWT	Shipping	Air	Total
1. Rice	78,969	204	36,109	4,261	0	119,543
2. Sugarcane/Sugar	3,682	0	4,847	88	0	8,617
3. Wood	11,499	523	11,683	914	0	24,619
4. Steel	41,965	2,156	1,015	764	0	45,900
5. Construction Materials	129,219	8,213	370,787	1,914	0	510,133
6. Cement	38,965	3,810	64,387	13,021	0	120,183
7. Fertilizer	8,813	2,939	28,678	1,168	0	41,598
8. Coal	12,106	2,377	92,549	10,092	0	117,124
9. Petroleum	33,374	404	5,018	8,234	0	47,030
10. Industrial Crops	5,628	0	2,415	0	0	8,043
11. Manufacturing Goods	171,895	4,895	3,916	13,524	251	194,481
12. Fishery Products	7,186	0	12,203	0	0	19,389
13. Animal Meat & Others	61,578	0	9,373	4,118	0	75,069
Total tonnage (ton/day)	604,879	25,521	642,980	58,098	251	1,331,729
Modal Share (%, ton)	45.4	1.9	48.3	4.4	0.0	100.0
Average Trip Length (km)	143	400	112	1,161	1,404	178
Modal Share (%, ton-km)	36.6	4.3	30.5	28.5	0.1	100.0

Source: VITRANSS 2 Study Team.

Table 5.4.9 Modal Shares of Freight Transportation by Commodity, 2030

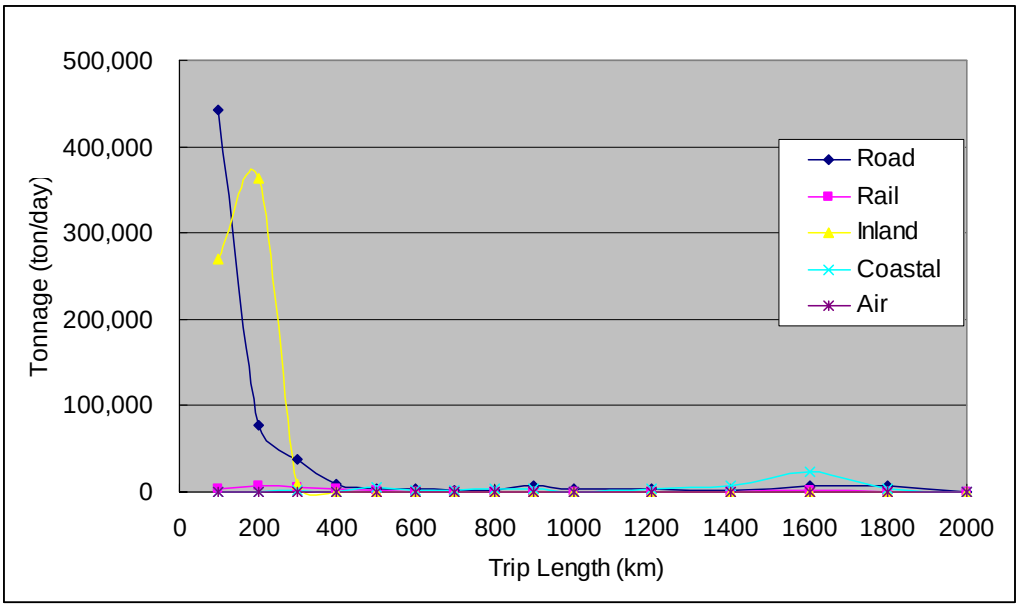
Commodity	Road	Rail	IWT	Shipping	Air	Total
1. Rice	257,547	4,800	70,604	18,483	4	351,438
2. Sugarcane/Sugar	46,516	2,918	32,975	379	0	82,788
3. Wood	59,485	6,701	31,251	4,876	0	102,313
4. Steel	179,199	11,389	12,507	1,143	0	204,238
5. Construction Materials	598,675	44,707	831,850	3,239	0	1,478,471
6. Cement	117,833	26,267	95,262	38,202	0	277,564
7. Fertilizer	20,948	6,395	34,411	1,761	0	63,515
8. Coal	18,630	3,219	109,710	14,948	0	146,507
9. Petroleum	86,272	5,505	13,693	13,938	0	119,408
10. Industrial Crops	19,439	1,597	8,547	121	0	29,704
11. Manufacturing Goods	634,061	36,742	40,488	24,082	1,002	736,375
12. Fishery Products	27,782	1,603	26,065	167	0	55,617
13. Animal Meat & Others	66,356	3,224	9,616	4,471	0	83,667
Total	2,132,743	155,067	1,316,979	125,810	1,006	3,731,605
Modal Share (%, ton)	57.2	4.2	35.3	3.4	0.0	100.0
Average Trip Length (km)	201	509	122	1,107	1,348	217
Modal Share (%, ton-km)	53.0	9.7	19.9	17.2	0.2	100.0

Source: VITRANSS 2 Study Team.

(3) Transportation Distance

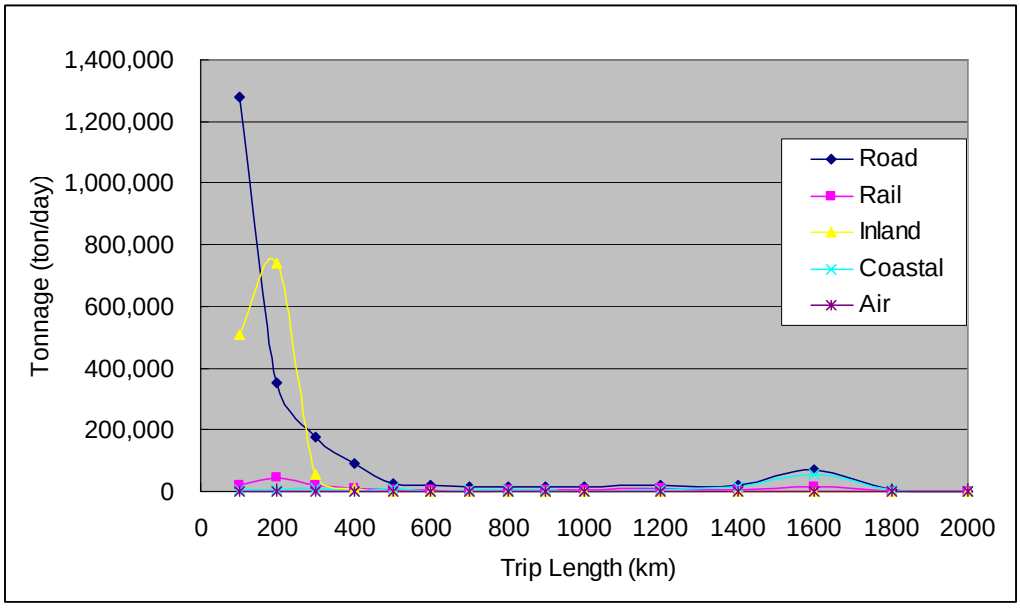
5.40 The figures below show the distribution of transportation distance by mode for the years 2008 and 2030.

Figure 5.4.7 Distribution of Transportation Distance by Mode, 2008



Source: VITRANSS 2 Study Team.

Figure 5.4.8 Distribution of Transportation Distance by Mode, 2030



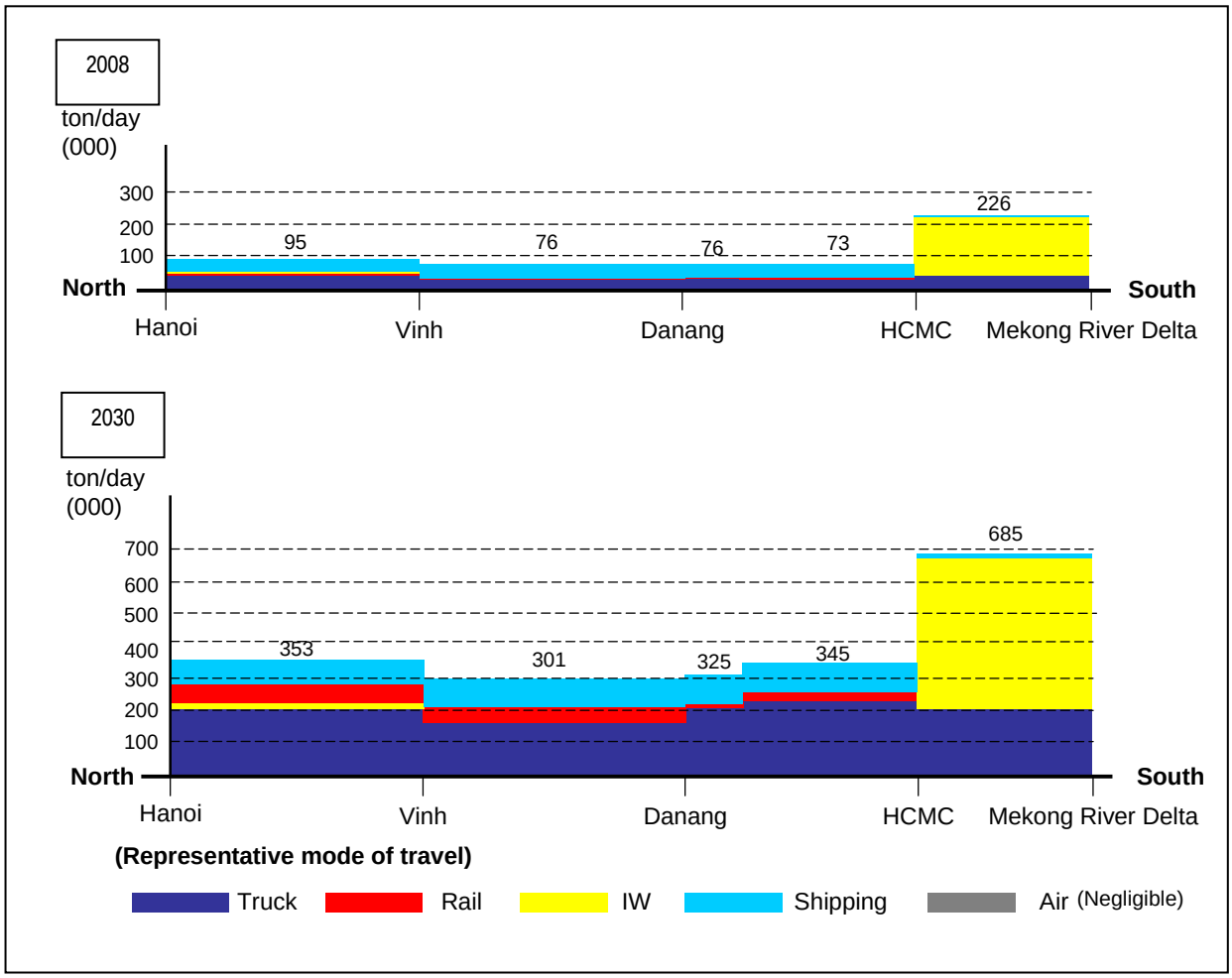
Source: VITRANSS 2 Study Team.

(4) Traffic Volume Assigned on the Transportation Network

5.41 Figure 5.4.9 illustrates the freight traffic distribution along the north-south corridor by mode. Truck, shipping, and railway will play an important role in the future with the significant growth of freight transportation demand along the north-south corridor. In contrast, the IWT will share a large part of the market in the Mekong River Delta.

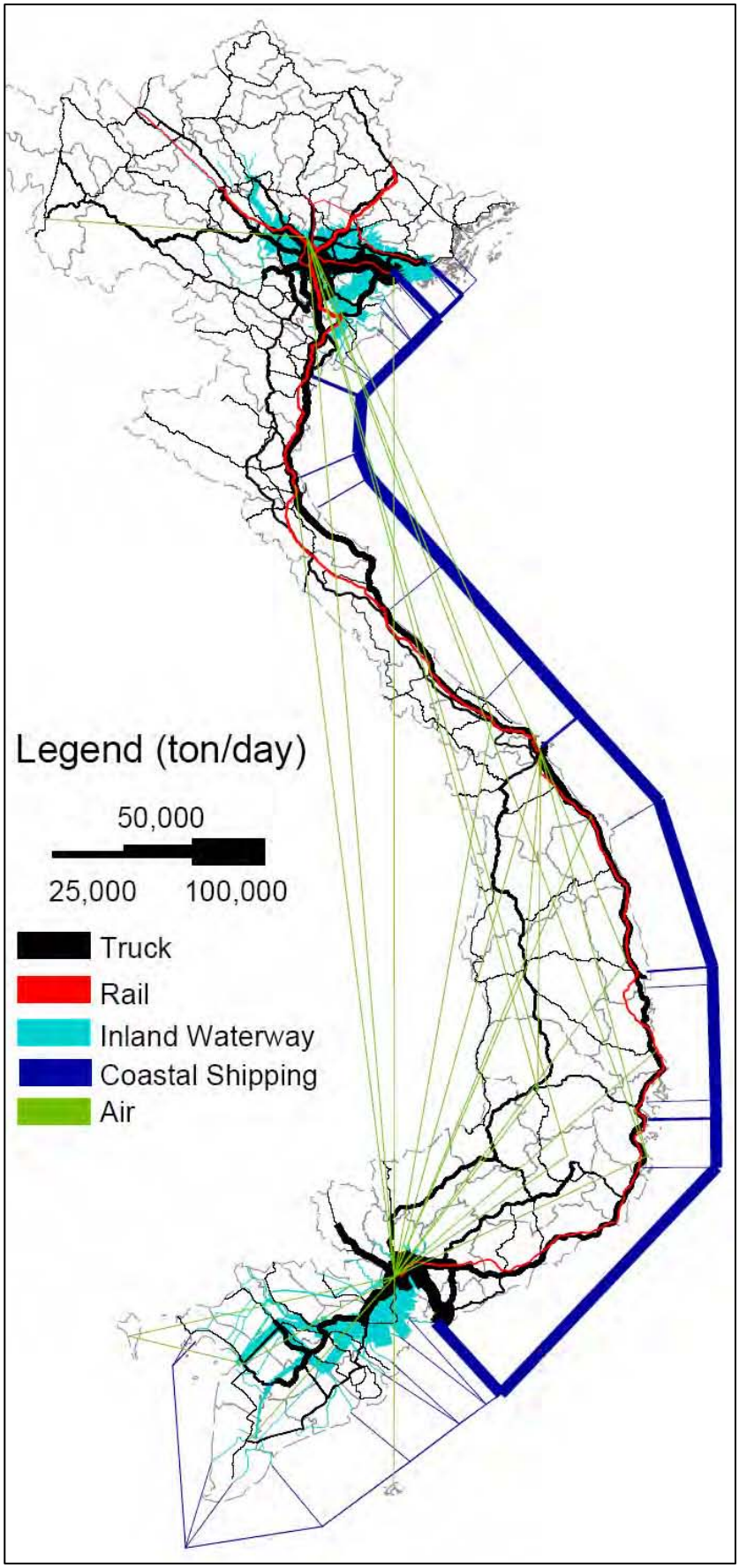
5.42 Figures 5.4.10 to 5.4.12 show the estimated traffic distribution of freight on the transportation network. By 2030, the road network under the "Do-nothing Scenario" will have exceeded its capacity.

Figure 5.4.9 Distribution of Freight Traffic on North-South Corridor by Mode



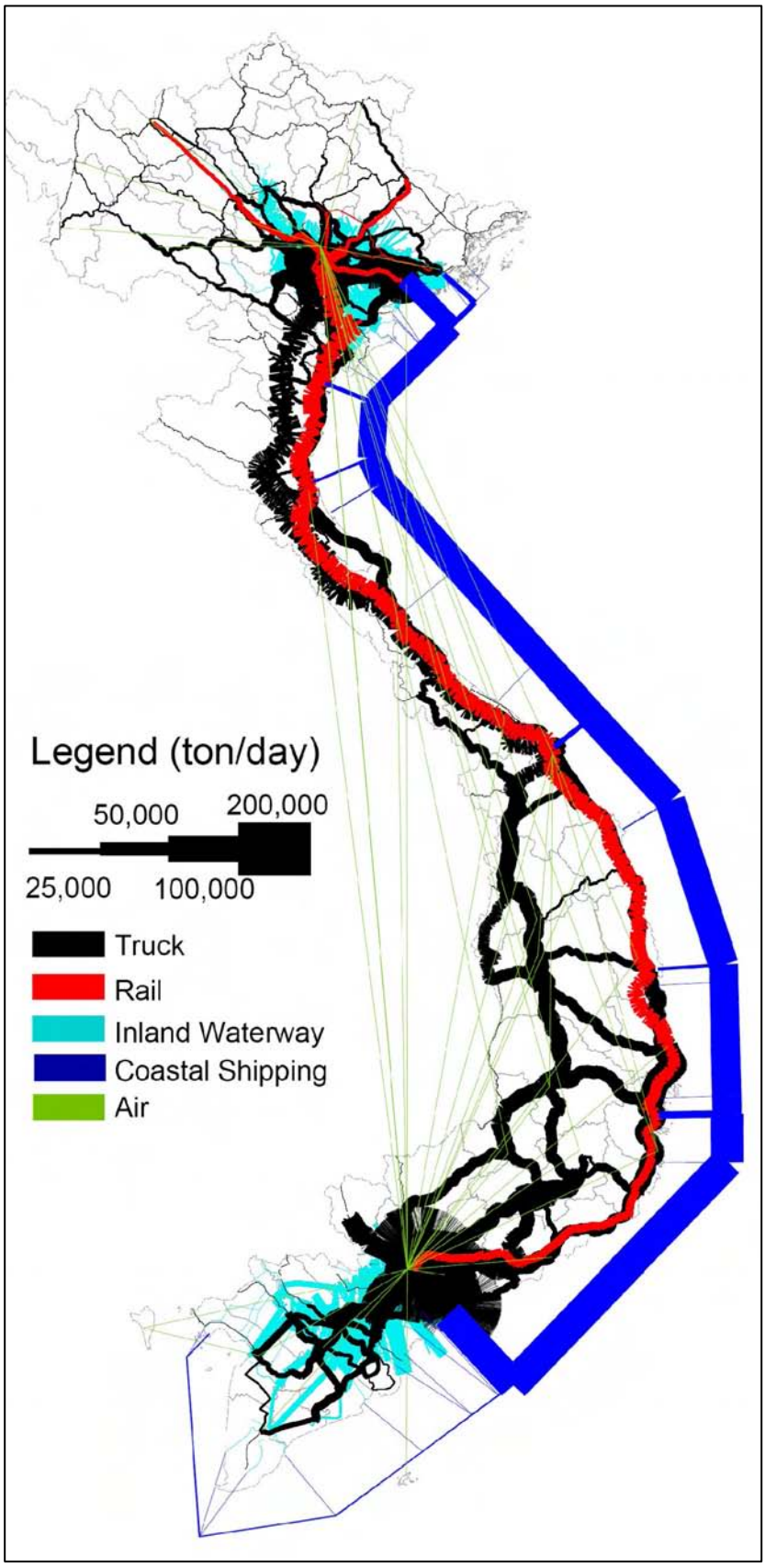
Source: VITRANSS 2 Study Team.

Figure 5.4.10 Freight Traffic Distribution, 2008



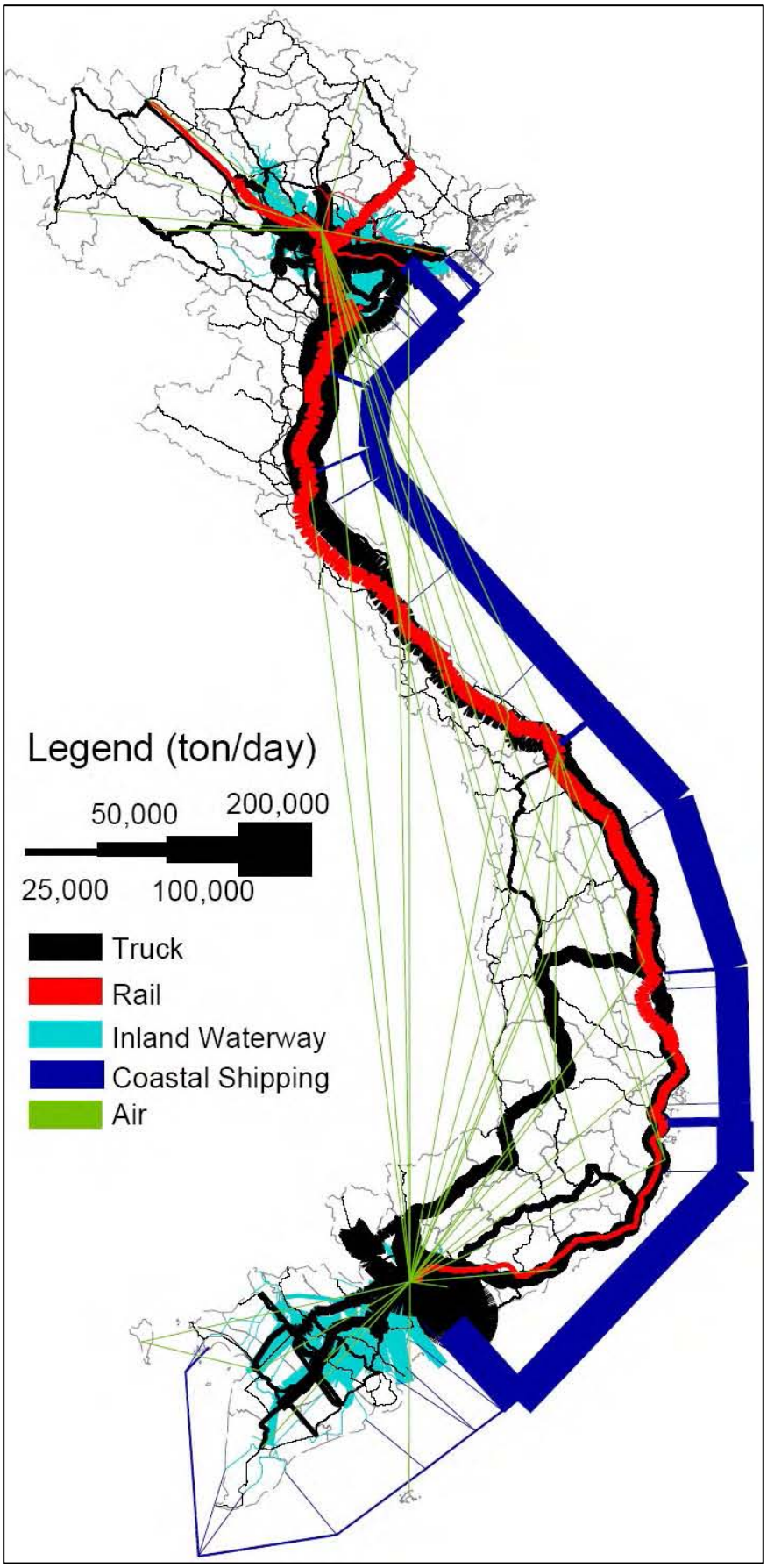
Source: VITRANSS 2 Study Team.

Figure 5.4.11 Freight Traffic Distribution under a Do-nothing Scenario, 2030



Source: VITRANSS 2 Study Team.

Figure 5.4.12 Freight Traffic Distribution under Scenario 1 (Improved CR + Expressway), 2030



Source: VITRANSS 2 Study Team.

6 TRANSPORTATION SECTOR INSTITUTIONS

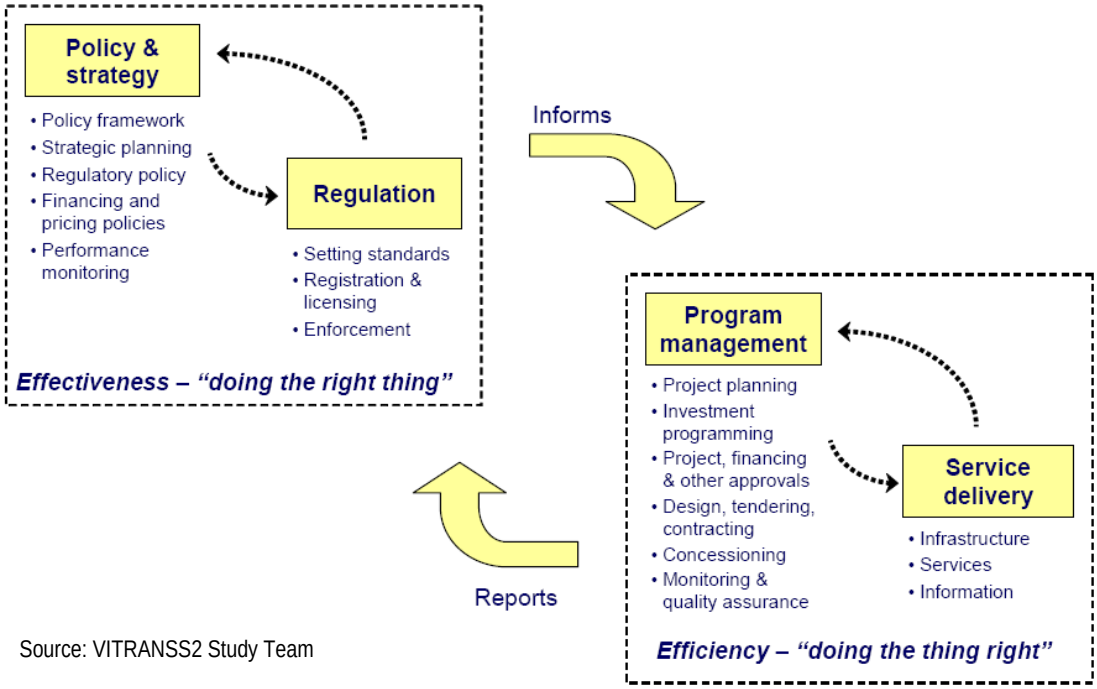
6.1 Current Institutional Arrangements

1) Organizational Framework

6.1 This chapter focuses on how the transportation sector is planned, developed, and managed by the public sector and how the entire range of business processes and activities are distributed horizontally and vertically.

6.2 The transportation sector has wide-ranging impacts and requires a broadly based agenda because transportation makes a multifaceted contribution to development that includes passenger and freight operations, spans urban and rural areas, covers public and private transportation, meets economic and social needs, and serves domestic and international demand. Because of this diversity and depth of the function of transportation, there is a consequent need to adopt a simple model, one that is in common usage internationally, in order to assist an understanding of the main institutional developments and changes in the sector. The activities undertaken by transportation institutions can be categorized into four main groups of activities and responsibilities (see Figure 6.1.1).

Figure 6.1.1 Main Institutional Responsibilities in the Transportation Sector



Source: VITRANSS2 Study Team

6.3 The four-pronged categorization framework of transportation institutional activities (commonly applied by the World Bank worldwide) as indicated in Figure 6.1.1 has been used as the basis to categorize the current institutional landscape in the transportation sector in Vietnam. This institutional landscape is indicated in Table 6.1.1. With the possible exception of urban transportation, the basic institutional structure is now in place within each transportation subsector. However, some additional steps need to be taken, which include defining the future framework for introducing PSP options in the transportation sector.

Table 6.1.1 Current Institutional Landscape in the Transportation Sector in Vietnam

	ROADS	Expressway	RAILWAYS	INLAND WATER	PORTS/ SHIPPING	AIR TRANSPORT
1. Planning and Policy	(1) Multimodal					
	MOT	MOT	MOT	MOT	MOT	MOT
	(2) Sectoral					
	Vietnam General Road Administration (GVRA), reports to MOT	MOT in general but not clear for Expressway	Vietnam Railway Administration (VRA), reports to MOT Vietnam Railway Corporation (VNR) reports to Prime Minister	Vietnam Inland Waterway Administration (VIWA), reports to MOT	Vietnam National Maritime Bureau (VINAMARINE), reports to MOT, VINALINES reports to PM Office	Civil Aviation Administration of Vietnam (CAAV), reports to MOT
2. Regulation: Technical	(1) Safety, Standards, etc					
	GVRA	GVRA in general but not clear for Expressway, for O&M very limited standards is existing	VRA	VIWA for ports, channels, & vessel operations	VINAMARINE for ports & ship operation	CAAV
	(2) Licensing					
	Drivers licensing by Traffic Police	Drivers licensing by Traffic Police	Train/Locomotive Operator, by VNR	Vessel Pilots licenses by VIWA	Seafarers registration by VINAMARINE	Pilots and aircraft technicians licensed by CAAV
	(3) Registration					
	Motor vehicles registered by Traffic Police; Vehicle Inspection: VR, Traffic enforcement: GVRA	Motor vehicles registered by Traffic Police; Vehicle Inspection: VR, Traffic enforcement: GVRA	VR	VIWA registers & inspects vessels	Vietnam Maritime Register, under VINAMARINE	CAAV registers & inspects aircrafts
3. Regulation: Economic	(1) Entry & Competition					
	Transport Business on Road: PDOT and TUPWS of company registration (Bus and freight service, for cross border service: MOT) Toll Road Business: MOT in general but for concessioning: MOT, GVRA, VEC and PPC (PDOT and TUPWS) for PH and DH	Transport Business on Road: PDOT and TUPWS of company registration (Bus and freight service, for cross border service: MOT) Toll Road Business: MOT in general but for concessioning: MOT, GVRA, VEC and PPC (PDOT and TUPWS) for PH and DH	Monopoly: VNR	Most barges are private for own-use; otherwise VIWA	Unclear on ports; shipping services from VINAMARINE	CAAV
	(2) Pricing					
	Fares on public transport set by respective Peoples Committees (PCs) Toll Rate: MOF	Fares on public transport set by respective Peoples Committees (PCs) Toll Rate: MOF	VNR set fares, subject to MOF approval	VIWA sets river fees; subject to MOF approval; PC's sets port charges	Fees, air fares, charges subject to MOF approval	Fees, domestic economy air fares, charges subject to MOF approval
4. Program Management	(1) Investment programming					
	MOT, MPI, MOF (by Govt Budget) MOT is authorised Govt Agency (for PPP)	MOT, MPI, MOF (by Govt Budget) MOT is authorised Govt Agency (for PPP)	MOT, MPI, MOF	MOT, MPI, MOF	MOT, MPI, MOF	MOT, MPI, MOF
5. Infrastructure Delivery	(1) Construction					
	PMU's under MOT and under GVRA (excl. expressways & local roads), Other Tender Winners	Awarding contractors under Expressway Owners including Concessionaires	Track infrastructure, by VRA and VNR	Ports and channels, by PMU's under VIWA (except LGU ports and local rivers)	Minor ports by VINAMARINE; major ports owned, built & maintained by Port Enterprises with varied ownership	By 3 Regional Airport Corporations, under CAAV
	(2) Maintenance					
	GVRA (excl. expressways & local roads)	Contractors under Expressway Owners including Concessionaires	VNR	Dredging by VINAWACO	Ditto	Ditto
	(3) Concessioning					
	Authorised State Agencies (ASA): MOT, GVRA, Vietnam Expressway Corp. (VEC) and PPC (PDOT and TUPWS)	Authorised State Agencies (ASA): MOT, GVRA, Vietnam Expressway Corp. (VEC) and PPC (PDOT and TUPWS)	In theory VNR	No single agency	No single agency	By 3 Regional Airport Authorities

	ROADS	Expressway	RAILWAYS	INLAND WATER	PORTS/ SHIPPING	AIR TRANSPORT
6. Service Delivery	(1) Carriers					
	Bus operators owned by LGU's, cooperatives, private companies	Bus operators owned by LGU's, cooperatives, private companies	Railway Transport Companies of VNR	Barging service by private companies & SOE's; VIWA's fleet is minority (~10%)	Vietnam National Lines (VINALINES) with 7 subsidiary companies, other shipping companies	Vietnam Airlines Corp, Jetstar Pacific, VASCO, Service Flight Corp (heli)
	(2) Public Users					
	Private cars, trucks, motorbikes	Private cars, trucks, motorbikes	None	Bancas and small craft	Bancas and small craft	Private aircraft
7. Basic Law	Land Road Traffic Law 23/2008/QH12	Land Road Traffic Law 23/2008/QH12	Vietnam Railway Law No. 35/2005/QH11	Inland Waterway Traffic Law 40/2005/QH11	Maritime Code of Vietnam 40/2005/QH11.	Civil Aviation Law 66/2006/QH11
8. Enforcement	Road Traffic Polices and Transport Inspectors of GVRA	Road Traffic Polices and Transport Inspectors of GVRA or others if any	VRA/VNR	15 VIWA River Management Stations	Vietnam Marine Police	Vietnam Air Traffic Management under CAAV

Note: Compiled by the VITRANSS2 Study Team based on existing information and available documents.

6.4 The Ministry of Transport (MOT) has the responsibility for planning, managing, and maintaining national transportation infrastructure. The MOT coordinates its planning function with some other central government agencies such as the MPI. It reports to the Government Office, which has direct responsibility for some national corporations including 3 major transportation sector agencies which are VINALINES, VINASHINES and VNR The revised charter of the MOT is laid down under Decree 51/2008/ND-CP signed by the Prime Minister on 22 April 2008. It is responsible for the development of the transportation infrastructure in Vietnam. Through its different modal administrative bodies and departments, the MOT has a mandate in the following areas:

(i) Setting policies includinfg developing legislation and regulations;
(ii) Planning, managing, and maintaining national infrastructure;
(iii) Assisting local governments in developing transportation plans and selecting transportation projects;
(iv) Providing oversight of public bus transportation development/ master plans;
(v) Developing long- and medium-term transportation sector strategies and plans; and
(vi) Integrating and prioritizing investment plans prepared by modal administrative bodies for submission to the MPI for inclusion in the PIP and to MOF for inclusion in the maintenance state budget.

2) Roads Subsector

6.5 Ownership and responsibility over roads is divided between national and local government units. Most national roads are under the Vietnam Road Administration (VRA), which was later renamed and upgraded into the General Road Administration (GRA). New regulations on the GRA operational charter and organization are being submitted to the PMO by the MOT for its consideration.

6.6 The GRA's Regional Road Management Units (RRMUs) maintain some 50% of the national road network, and the Provincial Departments of Transport (PDOTs) maintain the rest, which is committed from VRA, as provincial roads are under their jurisdiction. The GRA also plans the maintenance of the whole national highway network and commits neary a half of it to PDOT. Previously, it has concentrated on improving the RRMUs' performance. Under the GRA, there are four RRMUs in charge of national highway maintenance works in their duty areas. The RRMUs are responsible for the

administration of 48 maintenance companies. Maintenance work is mainly undertaken by SOEs through force account and restrictive bidding among SOEs. The GRA is responsible for the O&M of national highways. Its organization chart is shown in the subsector report for roads.

6.7 Since August 2008, the MOT has handed over four PMUs in charge of road development projects to the VRA (GRA). This means that the mandate of the GRA has now expanded to include: (i) investments in road development projects, and (ii) management and maintenance of the national highway. In the past, it directly managed some freight and passenger transportation companies (from the earlier Automobile Transport Administration). In 2008, these companies moved to the Vietnam Motor Industry Corporation (Vinamotor). In addition, the GRA administers several vocational and driver training schools.

6.8 The Vietnam Expressway Corporation (VEC) is an independent state owned enterprise formed through MOT's Decision No. 3030-QD-BGTVT dated 6 October 2004 which stipulated the setting up of a public expressway corporation at the national level. VEC has a total charter capital of 1,000 billion VND (one billion dong) from the state, in which: 50 billion will be allocated by MOT. The rest will have been obtained from selling the authorized right of some toll collection. VEC is entailed to run business on the followings: (i)Building, controlling, maintaining and organizing to collect toll in national highways; (ii) Constructing other traffic infrastructure works by various forms, (iii) Operating and running services along the expressway, such as guesthouse, restaurants, petroleum station, advertisement boards, and construction materials, (iv) Consultation: To study the development of national expressway network; to formulate PF/S, F/S, D/D, supervision, and (v) Researching on the development of type of services in expressway sub-regions.

3) Railway Subsector

6.9 In 2003, the Vietnamese government decided to introduce a separated structure for the Vietnam railways with the Vietnam Railway Administration (VRA) and the Vietnam Railways Corporation (VNR). The progress at this stage includes ongoing renovation of railway structures under a new enterprise law and a new railway law. Under the 2003 decision, the VNR should own the following assets:

(i) Station: land and facilities in station such as buildings, warehouses, and ground facilities, etc.; and

(ii) Locomotive and car depots: land, depot facilities.

6.10 The infrastructure entity, named Vietnam Railway Administration (VRA), should own the following properties and the corresponding activities:

(i) Bridges, tunnels, tracks including related land areas and superstructures; and

(ii) Signals and telecommunication systems.

6.11 The branch organizations are categorized into seven sections by financing and kinds of work, as follows:

(i) Transport bloc: transport operation center, Hanoi passenger transport company, Saigon passenger transport company, freight transport company, Rail traction company.

(ii) Infrastructure bloc: 15 railways management companies; 5 signalling and telecommunication companies.

(iii) Construction bloc: joint stock construction companies, construction material companies;

(iv) Industrial bloc: Di an train company , Hai Phong carriage joint-stock company;

(v) Material and services bloc: material companies, hotels, prints, magazines, health center;

(vi) PMU bloc: Railway PMU, Regioal PMUs I, II, III.

(vii) Non-productivity bloc: Regional railway vocational colleges I, II.

4) Ports and Shipping Subsector

6.12 There is no single national authority, which is responsible for overall ports development and management in Vietnam. The Vietnam National Maritime Administration (VINAMARINE), is an state agency of the MOT which plays role of state management authority in overall marintime transport sub-sector. It has 23 local branches (called local maritime administration) which act as Harbor Master, which regulates vessel traffic at ports, as well as enforces maritime safety and environmental standards, and related concerns.

6.13 Search and rescue operations, which in other countries fall under the Coast Guard, are also included within its mandate. VINAMARINE has PMUs involved in the construction of ports, which are developed by state budget (both domestic funds and ODA loans).

6.14 The major berth in gateway ports of Hai Phong, Saigon, and Cai Lan, however, are under port management enterprises of different ownership and management forms. Some provinces and cities own and operate their own berth and ports. The VICT port in HCMC and the Ba Ria Serece Port in Vung Tau province are managed by joint-venture arrangements of local and foreign partners. The Ministry of Defence owns an SOE which operates a container terminal at Cat Lai port in Ho Chi Minh City. It is also developing a new container terminal (Saigon New Port Cai Mep) in the Cai Mep Thi Vai area in Vung Tau.

6.15 While VINAMARINE presides over formulation of strategies and port master plans and licensing for port operation, concession for the port itself is issued by the local people's committee or municipal government. Port investments are overseen by the MPI.

6.16 A key player in the development and operation of Vietnamese ports is VINALINES, a multi-faceted SOE engaged in the shipping business. It holds equity interests in several large port projects such as Hai Phong-Dinh Vu Port, Cai Lan Port, Saigon Port, and also the first phase of Lach Huyen and Van Phong ports.

6.17 In port construction, VINAMARINE has two PMUs to supervise marintme project implementation.

6.18 VINALINES is a state corporation established in April 1995, with its official business initiation in January 1996. In 2006, VINALINES totally transformed itself into a holding company and then took the first step toward a group model. Since 2001, VINALINES has been under the process of equitizing its member and affiliated companies, while establishing new companies and joint ventures with foreign and local partners. As a result, VINALINES now consists of 26 subsidiary companies, 31 associated companies and 11 branches.

6.19 Administratively, the Prime Minister decision No 16/2008/QD-TTg dated on January 28, 2008 has classified port system into 3 classes: (i) 17 ports class 1, (ii) 23 ports class 2 and (iii) 9 ports class 3. At present, Vinamarine and MOT have submitted The comprehensive development port master plan up to 2020 and vision to 2030 for consideration.

5) Inland Water Transportation (IWT) Subsector

6.20 The VIWA is responsible for the provision of infrastructure along rivers, lakes and river ports and aids to river navigation (ATN) along the waterways classified as national

(which is about 6,574km). Maintenance, essentially dredging works, is contracted to VINAWACO, an SOE under the MOT that specializes in dredging. In some cases, dredging is initiated by local authorities, e.g., HCMC.

6.21 The remainder of the navigable waterways, including small ports, is managed by the relevant people's committees of provinces and centrally run cities. IWT projects are implemented by a PMU under VIWA, or a PMU under the MOT. Two regional enterprises report directly to the MOT, namely the Northern Inland Waterway Transport Corporation and Southern Inland Waterway Transport Corporation.

6.22 VIWA is subdivided into four local port authorities, which are each responsible for various common-use river ports. Not all river navigation signals are under the control of VIWA. The VMSA, under the control of VINAMARINE, manages the ATNs and dredging along the main rivers serving inland seaports.

6.23 VIWA has 15 river management stations looking after localized river navigations, including enforcement. In five of these 15 stations, the responsibility is exercised by joint stock companies.

6.24 River vessels, mainly barges and tugboats of different sizes, are registered with VIWA and VR. Theoretically, all vessels are required by law to be registered; in practice, many smaller river vessels are not. A similar situation exists for the pilots of such vessels. VIWA also has three technical schools, aside from publishing a trade magazine.

6) Air Transportation Subsector

6.25 The institutional arrangements in the air transportation subsector have been reformed further than in other subsectors. All the 22 airports are under the supervision of 3 Airport corporations which are (i) Southern Airport Corporation (SAC) (ii) Central Airport Corporation (CAC) (iii) Northern Airport Corporation (NAC). These Airport corporations are independent with CAAV.

6.26 The air traffic function is the responsibility of Vietnam Air Navigation Services Corporation (VANSCORP). In addition, the CAAV exercises supervision over ancillary organizations, such as Aviation Medicine Center and the Vietnam Aviation Magazine.The Vietnam Aviation Academy is now under MOT's supervision.

7) Organization of State-owned Enterprises

6.27 To date, there are SOEs indirectly under the MOT and under its subordinate administrative bodies such as VNR, GRA, VINAMARINE, etc. According to a World Bank report in 2007, there are 226 SOEs in the MOT, many of which, especially construction-related SOEs are short of funds.

6.28 To improve the situation, the MOT and the Government of Vietnam have several plans for SOE reform. Equitization is the MOT's plan to change SOEs' organizational structure into corporations with stocks. MOT has some elements of a phased equitization plan already in place for its SOEs.

8) Organizational Structure of PMUs

6.29 The implementation of national transportation construction projects in all subsectors is managed by Project Management Units (PMUs). Construction is carried out by SOEs attached to the MOT and provincial governments, as well as private sector companies. The MOT has over 200 SOEs and the primary activity of over 100 of these SOEs is construction.

6.30 The role and responsibility of the PMUs are not clear. For example, the PMUs continue to exist looking for other projects even after their initial objective has completed. Wile the majority of them belong to a subordinate modal administrative body of the MOT, some do not but report directly to the Minister.

9) Overview of Legislative Aspects

6.31 The legal framework is the foundation upon which all other aspects of the development and delivery of sustainable transportation depend. In addition to the development of long-term policy, legislation and plans, it is also in the public sphere of responsibility to manage and monitor development activity through regulation.

6.32 To date, the transportation sector has been equipped with a relatively complete legal and regulatory framework which supports and improves the performance of public administration within the sector. However, the implementing regulations for these laws require strengthening to ensure that the principles of competition and transparency govern all business and investment licensing matters, and that private sector participation (PSP), both domestic and foreign, is encouraged to enhance operational and managerial efficiency and quality, and increase investment.

6.33 The transportation laws passed in the past five years provide a sound basis for the efficient operation of transportation subsectors. Since VITRANSS 1 in 2000, all major transportation sector laws have changed. The laws for each of the five main transportation subsectors were reviewed, namely:

(i) The RT law was updated in 2001;
(ii) The IWT Law was updated in 2004;
(iii) The Maritime Code and the Rail Law were updated in 2005;
(iv) The Port Law was updated in 2005; and
(v) The Aviation Law was updated in 2006.

6.34 Besides the subsectoral laws, there have been a wide range of important extra-sectoral laws (‘Special Laws’), such as the Enterprise Law in 2005 and the Investment Law in 2006, which were promulgated following the need to comply with World Trade Organization (WTO) requirements.

6.2 Main Institutional Issues

1) Cross-sectoral Issues

6.35 Some crosscutting institutional issues have been identified in the transportation sector. These are described below and in succeeding pages.

(1) Planning Coordination

6.36 In all transportation subsectors, long-term transportation planning is characterized by “silo thinking” wherein the lead modal agency looks only at its mode in disregard of other transportation modes. Therefore, railways are planned without considering competition from expressways within the same corridor. A multimodal framework of coordinated transportation planning is missing. The MOT could take the lead role in this matter.

(2) Lack of Competitive Tendering

6.37 In the construction of infrastructure, the usual practice has been to assign the engineering design to an affiliate engineering SOE, and the construction work to another affiliate CIENCO without a competitive tender.

6.38 There has been no arms-length or impartial contractual relationship between the three parties—the owner (i.e., the project-owning agency), the design group, and the construction company—since control and ownership of the three agencies belong under the MOT or its agencies. A conflict occurs when the project is funded by ODA, since donor’s regulations often specify competitive tendering. A solution could be to equitize or move the engineering and construction companies out of the agency’s (and MOT’s) influence.

(3) Role of PMUs

6.39 Ideally, when a project or program has been completed, the assigned Project Manager and project team should return to their lead agency. In practice, this has been difficult and complex to implement. The PMUs somehow have managed to continue in operation even after their remits have been completed. The return to lead agency may be seen as a demotion—if not in rank, at least in remuneration and perks. A challenging new assignment may not often be readily available within the lead agency.

6.40 If the project personnel were released at the conclusion of the project or program, then the agency would lose valuable talents whose experience would be beneficial to the agencies and to the MOT.

(4) Development of PSP/PPP

6.41 PPP is also seen as a crosscutting issue. At present, there are no formal PSP/PPP institutions in the infrastructure/ transportation sectors, although plans are currently being formulated. Vietnam has recently established the basis for a PPP Unit in the MPI and has established a steering committee with members from the MOF, MPI, and MOT. This could form the basic framework for implementation of future PSPs/PPPs in infrastructure projects.

6.42 A draft decree on PPP was under preparation with World Bank financing. Suggested PPP institutional arrangements were made in the Draft Final Report (World Bank, DHV Consultants). The BOT Law (Decree No. 78) was regarded as inappropriate since it did not consider more recent forms of PSP such as O&M contracts. It is thought that the scope for PSP might be greatest within the road subsector; however, other sectors are

being considered. In the road subsector, funding to bridge viability gaps is expected to be required.

(5) Development of Logistics

6.43 Logistics is also seen as a cross-cutting issue. A decree on multimodal transportation was approved in 2003 based on the Framework Agreement of norms in ASEAN countries. There is a need to change and review some of the existing decrees, since some are not in conformance with the WTO. The completed Multimodal Transport Regulatory Review (MTRR) in Vietnam indicated that new and revised laws and regulations provide a good facilitating environment but implementation mechanisms need to be strengthened and clarified.

6.44 The freight forwarding business in Vietnam is developing, is quite competitive, and there is an active Vietnam Freight Forwarders Association. However, the industry is still handicapped by various constraints such as:

(i) Lack of a legal basis for freight forwarders to act as principals or multimodal transportation operators (MTOs) who are responsible for cargo transported by more than one mode of transportation. Rather, each carrier is separately responsible to the cargo owner under the general provisions of the Ordinance on Economic Contracts (1989);

(ii) Lack of other legal provisions in Vietnamese law in accordance with international practices (especially various ESCAP, ADB and UNCTAD proposals), lack of legal frameworks for road, inland waterway and railway transportation, outdated maritime law provisions (the legal liability is defined in terms of an obsolete unit of currency used in colonial times rather than the conventional SDRs), and the lack of ratification of certain international conventions, such as the Hague Rules and Hague VISBY Rules, concerning bills of lading, provisions concerning certain maritime transportation aspects about regulating ships and defining liabilities in case of ship collisions and oil spills; and

(iii) Insufficient coordination among the MOT, Ministry of Trade, MOF, and General Customs Department over policy matters to establish regulations and procedures for handling trade and transportation matters—the customs department does not appear to understand the role of freight forwarders in efficient transportation.

2) Roads Subsector

(1) Key Subsector Issues

6.45 Having received budget priority in the past decade, the focus has shifted away from rapid expansion of the road network into network preservation and improvement of connectivity and quality. Compared to other countries, Vietnam's main deficiency is the low ratio of paved roads and the relative paucity of secondary roads. The road hierarchy is unbalanced and is being further distorted by a huge planned program of expressway development (1,400km by 2010 and 5,753km by 2030).

6.46 The establishment of the VEC was motivated by good intentions, e.g., to tap private sector funding for toll roads and to establish a commercial structure. Unintentionally, this split in organizational responsibility could give rise to a fragmentation of the road network planning process. The GRA continues to plan the development of national roads, while VEC is supposed to be an investor and operator of BOT expressways..Expressways need to be planned as a subset of national roads network, which means MOT has to grant

GRA the primary task of planning the two types of trunk roads. Otherwise, VEC may build more expressways than appropriate.

6.47 Only a very few expressways are understood to be financially viable, based on current tariffs and projected traffic. The private sector is unlikely to step in, unless the regulations are changed and a viability gap funding is established. A large portion of the capital costs of expressways will continue to require public sector funding. It will therefore have to compete with other priorities for State budget support.

6.48 Road maintenance is thought to be substantially underfunded, but little is known about quantification of the scale and nature of the problem based on an assessment of road conditions, rate of deterioration, and appropriate remedial treatments. It was reported that the maintenance of national roads alone would require USD195 million in 2005. Anecdotal evidence indicates that many roads are relatively new and their present maintenance needs are negligible. But in 5–10 years' time there will be a step-change in the scale of the problem; already, problems are becoming obvious on older roads. Poor construction apparently has led to premature deterioration in some new roads. Similarly, truck overloading is exacting heavy damage on roads, while enforcement and weighbridges are lacking.

6.49 The answer to the maintenance problem is the creation of a Road Fund earmarked for the purpose. This is known and accepted, but remains on hold. The 5-year proposal of the MOT sought an initial fund of USD790 million to be sourced from fuel levies, tolls on national roads, vehicle registration fees, tax on tires, parking charges, and driving licenses. The proposed fund is about 15 times more than the current level of expenditures on road maintenance.

6.50 Preparation of a 5-year rolling investment program for roads, covering expressways, national primary and secondary roads, provincial and local roads, is recommended. However, this is made difficult by unrealistic project cost estimations, which lead to a wide divergence between planned cost and actual construction cost. In part, this is because costs are not based on engineering analysis or on empirically based unit costs.

(2) Some Institutional Issues

6.51 Planning for national roads in Vietnam is undertaken within a fragmented framework, with many players (MOT, GRA and other sectoral departments and VEC) For instant, two expressway MPs are concurrently happened, one by MOT and the other by VEC. Furemore, expressway MP is a separate component of highway MP. It is a problem to prepare different levels of plans by mode and geographical area, which are not well integrated and consistent with each other. This tends to lead to gaps and overlaps in investment decisions within and among transportation modes.

6.52 The GRA is supposed to be responsible for the integrated planning of the national road network. It is unclear how involved it was in the formulation of the existing master plan for expressways – which, by its scale seemed to have been formulated in isolation from the national road network. Under PM Decision No. 1734/QD-TTg dated 01 Nov 2008, MOT was designated as the authority to do network planning.

6.53 BOT toll roads are mostly unattractive for foreign investors because few transportation projects in Vietnam offer sufficient traffic volumes to make the projects financially viable from user tolls alone. It is noted that, as of February 2008, there were no legal documents for the O&M of expressways.

6.54 With the creation of VEC, the government has strengthened plans to accelerate the development of expressways. Two problems have been identified: (i) the relationship between the GRA and VEC with regard to road network planning, and (ii) the fact that VEC is both toll operator and toll regulator.

6.55 The first issue became apparent when the Expressway Master Plan unveiled a target of 5,873km of expressways. Such a scale would lead to an imbalanced—and inefficient—road network. A road hierarchy usually has an expressway at the top level of the hierarchy, with national, provincial, and tertiary roads at lower levels with proportionately greater coverage. The road network should be planned by the GRA, including the identification of higher classes of roads classified as expressways. Therefore, VEC would need to scale back the size of its target expressway network. Expressways cannot be viewed in isolation from the other main roads that feed into them.

6.56 The second issue involves the dual function of regulator and operator. Some experts have proposed the creation of another agency, a Vietnam Expressway Authority, in order to remove this ambiguity. Once VEC is converted into a shareholding company in 2010, as planned, its regulatory role must cease and be assumed by GRA.

6.57 A 3rd issue has emerged with PM Decision No. 1734/QD-TTg also stipulating that MOT shall perform “expressway construction, investment, and operation nationwide”. This needs to be clarified – that these will be carried out through VEC, and that construction and operation of toll expressways shall be left to the respective toll concessionaire. State-budget contributions to expressways via PPP arrangement ought to be channelled to VEC

3) Rail Subsector

(1) Key Subsector Issues

6.58 Today, three competing systems are emerging within the rail subsector. These are the established railway system, new urban metro systems in Hanoi and HCMC, and an ultra-modern high-speed railway (HSR). The jurisdictions and spatial boundaries for each system may overlap. The three systems are also expected to compete for scarce financial and human resources.

(i) Projects and proposals to improve, upgrade, and maintain the existing railway lines of the VNR belong to the first group. Its flagship project is the Hanoi–HCMC railway improvement, which is not full construction of new alignment like HSR project but improvement of existing line between Hanoi – HCMC, and its large rail assets in need of rehabilitation;

(ii) Urban railway projects in HCMC and Hanoi form the second group. The expected scale of committed urban metro investments far exceeds that of the first group; and

(iii) The HSR group’s keynote project has the support of top officials; however, the scale of investment dwarfs not only the size and scale of the first two groups, but also that of all other transportation sector infrastructure programs.

6.59 A decision to restructure the established railway group has already been made. However, the transition to the new business model, i.e., separating track infrastructure responsibility from operations, has been slow. Many of the organizational and management issues of the past remain. This can be traced partly to the difficulty of reforming from within and partly to the division of financial resources. When taken together, the finances of the rail group appear acceptable, with a fare-box ratio at about 1.2. In part, this is because

maintenance costs are low; were they at a sustainable level, the ratio would be lower. When separated and restructured, however, the situation for the track infrastructure division appears markedly worse than for the operations division.

6.60 The master plan for railways called for large increases in speed and capacity for all six (6) lines, without regard to what resources have historically been available. The technical solutions to the rail sector problems are known. But funding resources to solve the problems is much less than what is needed; implementation also has failed to fully exploit the funds that have been made available. Very little in the plan addressed the issue of how the railway could respond to a rapidly changing market. In each of the three strategic markets for rail (long-distance passenger market, freight market, and short-distance commuter market), market share is being lost.

6.61 More than 10 railway projects were listed for implementation via BOT schemes. None of these have materialized in part because of the delays in splitting the railway organization and partly because the projects were not ready for concessioning.

6.62 In the second group (railways/metros), there are two main thrusts of development. On the one hand, the VNR has proposed several new suburban rail projects. On the other hand, the cities of Hanoi and HCMC have launched their own intra-urban mass transit projects. In many cases, these two different projects would compete with each other for corridor space, for passengers, and for funds. With public transportation usage still below 10%, some of these projects may be premature.

6.63 In the case of the third group (HSR), there are substantial issues of lumpiness of the capital investment and significant construction and other risks. The project would require a minimum investment of USD56 billion (including rolling stock) to the exclusion of all other capital investments in the transportation sector for the coming 10-year period.

6.64 To carve out a more significant future role in freight transportation, railway should pay more attention to some of its weakest links, the interchange points with maritime transportation (at ports) or with land transportation (at freight yards). Small investments here would go further through collaboration or joint venture with the railways' industrial clients, i.e., those customers (e.g., coal enterprises) who cannot easily or profitably shift their goods onto competing transportation modes. Some sections within the congested urban area of HCMC, Hanoi, and Hai Phong will require construction of either elevated track sections or a relocation of track alignments. At the same time, the railway is likely to modify track infrastructure and interurban rail services to adjust to the phased implementation of urban Metro projects.

(2) Some Institutional Issues

6.65 The restructuring of the VNR has started and the separation of infrastructure and operation has been implemented. However, the actual reform has not yet been executed; the VNR has established a study team for the selection of optimum renovation ideas and aims to implement the reform from 2009 onward.

6.66 At present, railway infrastructure in general has been in a very poor state and many railway lines have not been rehabilitated to reach the required technical standards. Therefore, the full separation of the management and maintenance function and operation function will lead to many difficulties in train operation and securing train-running safety for Vietnam Railway Corporation. The separation will depend on the rehabilitation and modernization of the railway subsector.

6.67 The business model for the railway subsector has already been changed – separating track infrastructure from rolling stock operations. It is a necessary step towards a more sustainable railway. However, progress has been such that:

(i) Commercial development of each of the market segments is still minimal, with the focus of attention more on decreasing costs rather than on increasing revenues;

(ii) The separation of the old railway entity into two (VNR and VRA) has not yet been fully digested, resulting in information gap between operations (VNR) and track conditions (VRA). The corresponding devolution of responsibilities into each of the separated companies has not yet been fulfilled. VNR is still saddled with excess employees, with no clear downsizing plan and performance-driven human resource management system;

(iii) The delay in the re-structuring of the railways also postpones the longer-term move towards a sustainable railway subsector. It is expected that in due course proposals for HSR and the construction of new urban metros will further impact the existing railway organization. In addition, the construction of Expressways could further erode the railways market share of intercity passenger traffic.

4) Maritime Subsector

(1) Key Subsector Issues

6.68 While in some respects the subsector comprises many bodies/ ports, three organizations dominate:

(a) **VINALINES:** This is Vietnam's maritime "chaebol" that reports direct to the Office of the Prime Minister. It owns and operates 60% of the national fleet, operates most of important commercial ports, invests in others (including the 2 future gateway ports) and has talented staff. It is the dominant sector player.

(b) **VINAMARINE:** This is responsible for planning and regulating the subsector, and also operates some small ports. It reports to the MOT and is the traditional sector bureaucracy.

(c) **VINASHIN:** It builds ships, operates shipping services and reports directly to Prime Minister.

6.69 The maritime subsector is important to Vietnam, whose economy is strongly trade-focused, and to China's land-locked Yunnan province, providing access to trade routes via Hai Phong. HCMC dominates port demand, followed by Hai Phong – nowhere else features prominently. Vietnam has been trying to cope with the depth limitations of its estuarine ports in Hai Phong and in HCMC, which limit their access to smaller ships. While productivity in these ports has improved, their capacities have been increasingly strained by the rapid rise in foreign trade. Cargo volume has grown by more than 10% per year since 2000. For the northern region, the immediate priority is Cai Lan Port in Quang Ninh, followed by the development of Lach Huyen Port. For the southern region, the priority is the Cai Mep–Thi Vai Port. All these ports will have depths of more than 10 meters. Their respective locations have necessitated (or will require, in the case of Lach Huyen) provision of costly road access. A current question is whether these gateway ports will have sufficient capacity in the year 2020.

6.70 The existing port hierarchy appears to be top-heavy, with more Class 1 seaports than needed within a hierarchical system of hub-and-spoke ports. This may because prov-

inces have sought higher-class ports and partly due to the fragmented responsibility for port development. The national shipping line is involved in the development of many ports, besides the MOT, local governments, and state-owned industrial enterprises, including VINASHIN. The multiplicity of players makes coordination and integrated development of ports quite awkward, thereby delaying the establishment of linkages with transportation modes.

6.71 Containerization within the domestic shipping industry progresses but is constrained by policies that favor locally built ships. Domestic shipping, as in ports, is dominated by state-owned VINALINES. It has embarked on fleet modernization toward larger, if not more specialized, vessels, which should also lower the current average fleet age. This fleet expansion is likely to increase the oligopolistic position of VINALINES, since other shipping operators do not have ready access to financing.

6.72 The focus on fleet acquisition has relegated the development of crew competence to a secondary position. Shipbuilding is promoted while at the same time dockyards for ship repairs are inadequate. A basic weakness of Vietnamese flag vessels is the wide gap that separates them from International Maritime Organization (IMO) standards.

(2) Some Institutional Issues

6.73 In the maritime and shipping subsectors, shipping poses less of a complex institutional issue than does port development. The latter involves the complex roles of VINAMARINE, VINALINES, and other port owners. VINALINES has been effective in the realization of State objectives in the shipping subsector. But its resources for port investment may be overstretched. Further large investments in ports can only serve to reduce the resources available for the development of international and domestic shipping.

6.74 There are several structural models available that address this separation. In most countries, the port owner and developer is separate from the shipping company. The port authority leases out and grants concessions over individual ports to terminal operators and companies. Another model is the so-called local port authority model. Whichever model is eventually adopted for Vietnam, the good features of the current arrangement—where local port bodies function autonomously and involve the private sector—should be retained. It is sensible for VINAMARINE to evolve into a single national port authority, and port regulator, without any participation in port operations or the management of the business aspects of ports.

6.75 On the national level, the current system of having a multiplicity of investors and port developers—central ministries, local governments, SOEs, and private sector—is not conducive to a systematic port development strategy under limited funding. The multiplicity of players makes coordination and integrated development of ports quite problematic. The administrative system therefore to integrate plans, as well as develop and manage the port facilities and the surrounding water and land area, needs to be established.

5) Inland Waterways Subsector

(1) Key Subsector Issues

6.76 Despite Vietnam having an extensive river network, inland waterways transportation is the least developed of the transportation subsectors. In past times, it was the main transportation mode and civilizations emerged along the river routes. The cities of HCMC, Hanoi, Hai Phong, and Danang were all originally developed as river ports. IWT has retained some advantages for bulk transportation.

6.77 Inland waterways transportation suffers from a technical and image problem. It is

subject to the vagaries of nature, which renders planning uncertain. River training works can be small in one year, but suddenly becomes substantial the following year due to flooding, etc. Tidal conditions can limit IWT operations. Drought in summertime can greatly reduce navigable depths. The features of IWT in the three regions differ markedly. Barges are operated individually and by industries. They usually load/ unload off-ship.

6.78 Inland waterways transportation should be strengthened. Some important industries, such as the transportation of coal to power plants and cement factories in the NFEZ, are dependent on IWT for viability. In the Mekong delta, a varied range of industries thrive; many poor villages depend on IWT for access and livelihood. Cross-border trade to GMS countries is facilitated by IWT. In the Mekong delta particularly developmental/ poverty alleviation benefits accrue to IWT interventions.

6.79 The inland waterway systems differ by region. That in the north is subject to fluctuating river discharges, which results in shorter useful operating time and higher maintenance costs. It is used mainly to carry coal to cement works/ power stations, and flows tend to be “tidal”, hence relatively inefficient. In the Mekong delta, there are no such uncertain changes in water levels. The waterways can be used more efficiently; and cargo tends to be 2-way, with cargoes to Kampuchea (including containers) and primary commodities downstream.

6.80 There is, therefore, a core IWT network whose navigability should be maintained due to the long-term demand from industrial users, etc. This should exclude waterway routes with temporary requirement only (e.g., Viet Ri–Na Hang–Tuyen Quang in northern Vietnam). Additional investments can also be justified to safeguard, upgrade, and improve another set of important river channels. The evidence is that relatively small investments to remove bottlenecks (in terms of bank protection, dredging, easing of curve radii, provision of navigational aids for safety and possibly also night-time operations) can yield significant benefits.

6.81 Most users of the waterways are large enterprises, which operate their own barge fleets. Their long-term goal is to shift to self-propelled as well as larger barges to achieve greater efficiency. However, this cannot be implemented due to shallow channel depths in most cases, and low bridge clearances in some cases (e.g., Cho Gao Bridge and Binh Loi Railway Bridge).

(2) Some Institutional Issues

6.82 There appears to be little to reform or change in the institutional arrangements for inland waterways transportation. There is a potential problem arising through the amorphous delineation of responsibilities over sections of the inland waterway networks between VIWA and VINAMARINE because the major seaports of Vietnam are physically located on rivers. This gives rise to some ambiguity as to where IWT ends and coastal shipping starts. This ambiguity has led to uncertainty over the jurisdiction for current usage and maintenance of river ports and channels. IWT sometimes seeks to attract ocean-going vessels to bigger upstream ports, or stake out routes into islands or routes that combine both river and sea journeys. Conversely, the coastal shipping industry wants rivers to be dredged deeper so as to operate ocean-going vessels further upstream.

6.83 Another question arises: when the river port traffic relocates in the future (e.g., from Saigon to Cai Mep/Thi Vai), what will be the classification of the river channels leading to Saigon?

6) Aviation SubSector

(1) Key Subsector Issues

6.84 If based solely on market share of passenger and freight in the total transportation market, the aviation subsector looks insignificant. However, it is critically important, especially for foreign trade and tourism, as well as for domestic alternative access to remote regions. Aviation traffic has experienced fast growth rates in the last five years, i.e., 19.4%/year for passengers and 18.4% for freight.

6.85 There are no major issues facing the subsector. Government is moving in the right direction and has already adopted major policies that would position the subsector for a better future. It has separated the regulatory function from the operator role. Competition in domestic scheduled services has emerged, coupled with the adoption of a more liberal fare policy on routes with more than one service provider. But it needs time to build staff capacity as a result of these changes.

6.86 Equipment for cargo handling is poor and airfreight takes a long time. Private sector participation in airport developments is desired but not actively pursued.

(2) Some Institutional Issues

6.87 The recent restructuring of air transportation institutions—the CAAV for the overall regulation of aviation and three regional airport corporations for airport development and operation—is well on course.

6.88 Because of the institutional reforms already adopted in aviation, little further institutional development needs to be done in the aviation sector. The main thrust is seen as a need to accelerate the full re-structuring and to fill the skills gap.

7) Urban Transportation Subsector

(1) Key Subsector Issues

6.89 Vitranss2 did not cover urban transport sector per se. However, it is being mentioned here from a policy standpoint because about 25 million additional people will have to be housed in the cities of Vietnam within the coming 20 years. They cannot all be concentrated in Hanoi or HCMC; otherwise, congestion would become unmanageable, and the resources of these cities will be severely strained. How to direct this growth in urban population toward secondary cities—particularly medium-sized cities—will be a major challenge.

6.90 HCMC and Hanoi have started to construct rail-based mass transit systems. The first lines are some years away from opening, but commitments are already being made for metro network extensions. The capital needed to bring all metro lines into operation is estimated at USD15 billion. In order to maximize the benefits from this large investment, recover cost, and improve the urban environment, it is necessary to configure its network and feeder services in the most effective manner to enhance ridership and to develop commercial/public service facilities at and around the stations.

6.91 Even after the development of the urban rail network, buses must meet the largest portion of public transportation demand. While both HCMC and Hanoi made initial success in bus operations, the quality of their services needs further improvement and the system needs expansion to include the replacement of old buses, upgrading of bus facilities, and improvement of operational management system. Upgrading of bus systems and services in Hanoi and HCMC is urgently needed. On the other hand, urban bus services in secondary cities are still at infant stage. However, urban areas have been expanding quickly through excessive land conversion mainly to generate revenue for local govern-

ments. This is a potential threat to the development of compact urban areas.

6.92 Another challenge for the key cities in Vietnam will be to manage the transition from motorcycle to public transportation usage, and to control ownership and usage of private cars. Particularly, the sharp increase in private cars and automobiles is becoming a main cause of traffic congestion in big cities. As urban rail and bus transportation services improve, measures to control private vehicle use must be seriously considered through pricing and parking policies.

(2) Some Institutional Issues

6.93 City responsibilities are excessively fragmented: both Hanoi and HCMC have different agencies planning and implementing rail and bus systems with limited coordination among them. The Ministry of Construction (MOC) is the central agency that leads in formulating the metropolitan regional plans for Hanoi and HCMC. There is weak central-local government coordination exhibited by a lack of coordination in policy formulation among the MOT, MPI, and MOC.

6.94 There is also a lack of metropolitan/regional institutions that can coordinate between and among local governments to minimize the incentives for jurisdictional boundaries to distort development and hamper a coordinated planning approach.

6.95 In medium-sized cities, the urban transportation subsector lacks funding for investment and recurrent work as well as the capacity to manage the subsector efficiently. As the MOC is tasked to oversee the provision of transportation infrastructure for medium-sized cities, there is a need to address the gaps in infrastructure needs and capacity building.

8) Multimodal Transportation Subsector

(1) Key Subsector Issues

6.96 There is as yet no multimodal transportation corridor in Vietnam. The need to define improved freight transfers, such as between the road network and ports or airports, between the road network and railway loading bays, or between barge delivery area and trucks is becoming increasingly important.

6.97 The reason is mainly institutional. The transportation system is organized by transportation modes, and no single mode is focused on creating “multimodal chains” and “seamless transfers at nodes” which are needed to lower transportation costs. Modal administrative bodies have been used to defining rather narrowly focused plans.

6.98 Inadequate infrastructure has always been cited as the reason for the high logistics costs in Vietnam, estimated by some at 25% of the GDP. This is higher than China, Thailand, or Japan. Accordingly, Vietnam has embarked on aggressive programs to improve ports, road, rail, waterway, and airports infrastructure. More than these, modern logistics demand a parallel development of the “information and communications highway”. And yet, logistics cannot wait for the completion of all of these elements before it can be globally competitive.

(2) Mainstreaming Multimodal Planning

6.99 The MOT should assume the role of multimodal planner and require each subsector agency to submit projects that have been properly evaluated. Concurrently, the MOT can examine a project’s “last-mile” problem, i.e., the connectivity of one mode to another, so that desired adjustments or remedies are also implemented in a coordinated manner.

(3) Development of a National Logistics Development Strategy

6.100 A multimodal framework is invaluable in identifying bottlenecks and weaknesses across the supply chain. Targeted intervention is the key to improving Vietnam's logistics performance. According to the World Bank 2008 survey on logistics performance, domestic transportation cost is not the main issue. Rather, the poor timeliness of shipments is at fault, which, in turn, leads to higher than needed warehousing and inventory costs. Creating electronic portals that can link the various logistics players (such as freight forwarders, customs, truckers, shippers, rail freight companies, manufacturers, etc.) will be one important intervention. The easing of cross-border trade procedures is another, since Vietnam ranked poorly on this dimension despit recent initiatives of the government.

6.3 Regulatory Framework

1) Some Regulatory Issues and Problems

6.101 The main objective of the development of transportation organizations is the realization of more market-based, competitive and sustainable organizations. The government has restructured the regulatory framework by relaxing entry control, allowing private sector investment in transportation infrastructure, liberalizing tariffs, etc. However, problems remain and organizations have not yet achieved sufficient competitiveness in the market mechanism.

6.102 Apart from the laws, decisions, and decrees that define the organizations in the transportation sector, there are legal provisions defining important functions within the sector which can be grouped as follows:

(i) Specific implementing regulations, usually for each mode, giving the precise rules for general transportation activities (traffic regulations, inspection and registration of equipment);

(ii) Business regulations (transportation licensing, tariff setting etc.) which define the legal basis for commercial transportation services; and

(iii) Other aspects (safety, planning and provision of infrastructure, insurance).

6.103 Nonetheless, the implementing regulations for these laws require strengthening to ensure that the principles of competition and transparency govern all business and investment licensing matters, and that private sector participation, both domestic and foreign, is encouraged to enhance operational and managerial efficiency and quality, as well as increase investment. While laws have provided the broad framework for the sector, it is regulation that will provide the guidance on how the laws are to be interpreted and, further, who and how they will be done.

2) Basic Principle

6.104 The subject of economic regulation touches on the entry of providers and the consequent competition and pricing policy to recover the investments. There are two aspects in the transportation sector that are the objects of economic regulation, i.e., the provision of transportation infrastructure by non-state entities and the provision of transportation services.

6.105 The provision of transportation infrastructure by non-state entities is usually undertaken by BOT arrangement or through PSP, where a private company could be authorized to build, finance, and operate the fixed infrastructure and collect tolls for a period sufficient to recover the capital invested plus some reasonable profits. Other forms of PSP include O&M and ROT concessions.

6.106 The provision of transportation services is usually undertaken by private sector carriers or private providers of transportation services. In the past, the provision of transportation services, both infrastructure and service provision, was done by SOEs. The private sector was virtually non-existent; hence, the government had to regulate itself through the merger of regulatory and operational functions within a single entity. Inefficiency resulted with such an arrangement, since it confused social and economic objectives. With the opening up of the economy, some previous regulatory arrangements are becoming outdated.

6.107 The market economy model has as one of its fundamental principles the separation of the regulatory and operational functions. Therefore, if a government enterprise en-

gages in the same line of business as the private sector, it must do so on the same level playing field—without any unfair advantages. Under the market system, the government cannot be both a referee and a competing player. The Vietnamese economy is still in a transition from the old to the new market models, and the participation of the private sector in some subsectors is more advanced than in others.

3) Some Regulatory Issues

6.108 **Road Subsector:** There has been some change in the road subsector during the last five years when VEC has been organized to handle all expressways and to organize separate entities for specific toll roads, in joint ventures with private investors. In its present form, VEC is the planner and the regulator that awards the concession to each separate toll road operator, not through a transparent tender but through selection.

6.109 By holding equity interest in the toll operator, it could be confronted with a potential conflict of interest—as an investor who wish to maximize his profit, and as a regulator who wishes to minimize the toll rate for the benefit of the public.

6.110 **Railway Subsector:** The purpose of the rail restructuring program was to remove the conflict between commercial and social objectives. At present, the railways regulates itself. Internal cross-subsidies between the various profit and cost centers are not well specified, thereby reducing the likelihood of private sector participation.

6.111 **Port Subsector:** The technical regulations of VINAMARINE appear to have been followed, without major issues. However, the regulatory situation in the ports subsector is not very clear. There are many different port operators with no overall economic regulation. There has been some form of government price regulation, although this is not set by the market.

6.112 **IWT Subsector:** The conflict between the social and commercial objectives has been resolved, more or less, in the IWT subsector. VIWA no longer operates a large fleet and has not the resources or inclination to expand the transportation business. The dominant users of the waterways, i.e., the industries,have set up their own transportation operations or outsourced the same to third party barging operators. There are common-use ports that VIWA owns and operates, but they are also open to competition from ports owned by local governments and from road transportation. The transporters of bulk commodities do not use these ports.

6.113 **Aviation Subsector:** The regulator of the airline business is the CAAV, which neither owns nor engages in airline transportation operations. Airports are by nature monopoly businesses and need to be regulated. In Vietnam, there are airport authorities which perform this role.

7 LONG-TERM TRANSPORTATION STRATEGIES

7.1 Transportation Sector Goals and Objectives

7.1 Based on the Socio-Economic Development Plan of Vietnam, the vision of Vietnam's transportation system can be classified into: (i) competitiveness, (ii) integration and inclusion, and (iii) sustainability and safety. The strategies as well as the planning and implementation of projects for each of the transportation subsectors need to be guided by a set of principles or policies. These are summarized in Table 7.1.1 below.

Table 7.1.1 Policies and Principles for the Transportation Sector of Vietnam

Aspect	Description
1. Multimodal in Approach	• Transportation planning and projects must be viewed from the perspective of competing and complementary transportation modes. The 'silo thinking' in institutions has to end, by instituting modal challenges. The HSR option between north and south can be evaluated against a new high-speed water transportation, or an expressway against a conventional railway. The aim is to achieve an appropriate balance, or mix, of transportation modes that utilizes the fewest economic and human resources.
2. Seamless Movement	• Movement of people and goods, particularly the latter, shall examine the full journey across all modes. Accordingly, closer examination of the interface or transfer points, as well as the "last-mile" impediment – infrastructure or regulation, shall be made with the objective of ensuring as seamless a travel as much as feasible. The 'whole of supply chain' for strategic commodities deserves preferential attention. This also encompasses the harmonization or compatibility of transportation technology and rules at cross-border points.
3. Private Sector Involvement	• In delivering the desired outcomes, involve the private sector whenever possible in the building and management of transportation infrastructure. In transportation services, private sector should be the first choice.
4. Competitive Markets	• The transportation market should function as efficiently as possible, with minimum distortions from government regulations, so that each mode reflects its true cost to the economy and users are able to choose freely and respond. This also implies levelling the playing field, encouraging competition, consistency and predictability in the application of rules, and permitting inefficient enterprises (SOEs included) to fold up, government intervention as a last resort.
5. Cost Recovery	• To the extent feasible, the full life-cycle cost of transportation infrastructure shall be recovered from its direct beneficiaries; where such is not possible, a mechanism for covering the shortfall shall be instituted. For example, the capital and maintenance cost of a river channel may not be recoverable from all users because of tolling practicalities. A frontage levy on riverbank users, or annual vessel fee on barges, could be imposed. A transportation fund created from a levy on fuel is also possible. It also implies cost-based tariff regime.
6. Participatory and Inclusive	• The views of relevant stakeholders within and without the governments, central as well as local governments, shall be considered whenever possible.

7.2 The Prime Minister's Decision No: 153/2004/QD-TTg on Strategic Orientation for Sustainable Development stipulates key activities to successfully implement sustainable development in the transportation sector. VITRANSS2 is one of the said activities. These are:

(i) To build up a uniform policy system in order to sustainably develop the sector, including policies on land use, infrastructure development and construction of public transport network, to encourage private sector participation, and to use low-emission means of transport.

(ii) To plan transport network consistently with environmental conservation in harmony with regional development.

(iii) To focus on public transport network in large urban areas, encouraging use of public transport by economic and administrative measures, and restricting growth of private transport means, as well as promoting environmentally friendly means of transport.

(iv) To accelerate transport development in rural and mountainous areas.

(v) To improve traffic safety by education on traffic rules and regulations.

7.3 Translating objectives into a deliverable strategy needs to recognize at the outset some realities about Vietnam. These are:

(i) Vietnam's twin centers of economic gravity are 1700km apart. They account for 60% of the GDP. In between, there is very little to speak of. Redistributing growths, particularly to the central regions, will require deliberate policy interventions whose results will take decades to materialize.

(ii) Long-term plans in all transportation subsectors have been laid out, but without regard to what realistically can be financed. The result is every project becomes a priority, and therefore no clear priority.

(iii) The size of the State sector has declined, but still significant (if not dominant) in all transportation subsectors. Further downsizing and/or equitization are hitting a wall.

(iv) Importance is being attached to urban transportation, because this will increasingly dominate national sustainability, and because it calls for large investments that would compete with other priorities.

7.2 Challenges for the Next Two Decades

1) Main Issues

7.4 In recent years, fundamental reforms have taken place in nearly all the subsector institutions—changes that will enable Vietnam to better grapple with future challenges. The separation of policy, regulatory, and operational roles in the aviation subsector is particularly noteworthy, but similar progress in other subsectors had been spotty. A multimodal orientation is lacking, resulting in imbalances and faulty integration between subsectors. Funding for maintenance is lagging, particularly in inland waterway channels and roads.

7.5 Provinces have not been as involved in meeting the transportation challenges as they can be; the size of their budgets for transportation (about 2–3% of their respective GRDPs) could be leveraged for maximum impact. Private finance in transportation infrastructure is still at its infancy, constrained by institutional barriers.

7.6 There are too many projects under consideration—a product of strong attachment to long-term planning—but priority setting is weak, resulting in unrealistic expectations. The issues that the transportation sector has to address as it moves from the present to the future can be summarized in Table 7.2.1 below.

Table 7.2.1 Issues in the Transportation Sector of Vietnam

Infrastructure	Services
1. Disconnect of urban and regional planning with infrastructure development	1. Unsustainable subsidy in urban transportation services, particularly in buses (and soon, also in rail transit)
2. Compartmentalized subsector planning that hampers intermodal and multimodal transportation complementation	2. Inefficient pricing and regulation across all modes that result in imbalances of mode choices and investment
3. Imbalances in resource allocation between sectors, and between capital and maintenance expenditures	3. Extensive involvement of State in the provision of services, particularly in ports and shipping
4. Lack of sustainable source of financing for transportation, particularly for IWT and railways	4. High level of unsafety, particularly in road subsector and railway crossings
5. Better use of existing assets, especially in ports and airports, takes a back seat to capacity expansion	5. Transition from motorcycles to public transit in urban commuting
6. Carbon emission and energy demand, with rapid motorization	6. Increasing need by export industries for more sophisticated logistics services
7. Appropriate participation by private sector in the development of ports, airports, expressways, and logistics	7. Connecting remote villages and increasing their accessibility to the transportation network

7.7 It was difficult enough for Vietnam to resolve the above issues and simultaneously modernize its transportation system, in a predictable world of growing economies. Then, the financial crisis struck unexpectedly in 2008 and plunged the world's future—and Vietnam's—into uncertain terrain. For the first time since 1982, global trade will shrink by 9% in 2009, according to the WTO. The International Air Transport Association (IATA) expects the Asia-Pacific carriers to be the hardest hit by the economic turmoil. International shipping is also hitting the docks, moored for lack of business, as shown by idled gantries in once busy hub ports and vessels. Worse, the export-led and FDI-driven path to development to which Vietnam has latched on, is now reeling under the impact of the global financial crisis. Just when Vietnam has begun to master the game of development, the rules have changed.

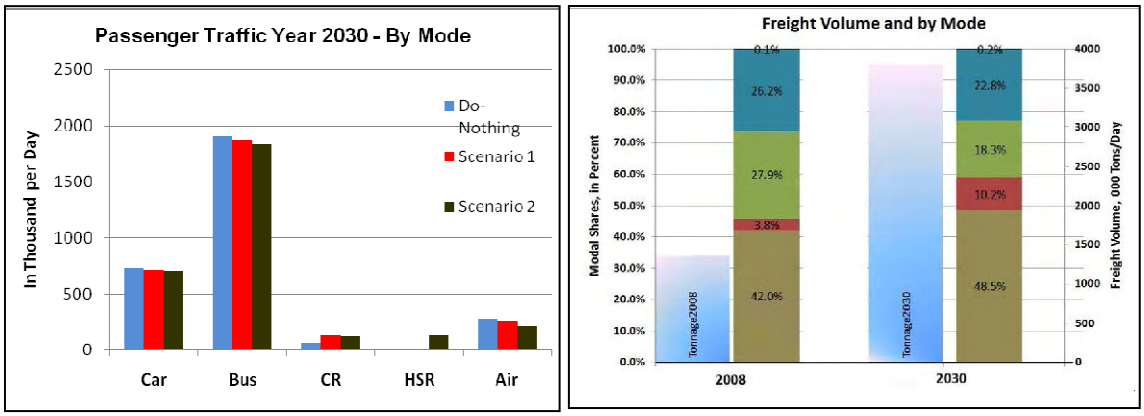
2) Growing Transportation Demand

7.8 Traffic has grown rapidly in the last decade, slightly faster than the country's economic growth (which grew at an annual average rate of 7.5% from 2000–2008). On the premise that the world economy, and Vietnam's, can get back on track, the country's economic pie is forecast to be three times bigger by 2030. Total population would be 28% larger, but urban residents would balloon by 90%—the equivalent of building seven more cities the size of HCMC over a short span of 20 years. Such an economic growth would translate into transportation demand discussed in Chapter 5 of this report. Interprovincial passenger traffic would be three times higher, and freight volume, 2.8 times higher.

7.9 Traditional planning approach would automatically seek to provide the required capacity based on predicted demand. This has been the case with past master plans, which, because of compartmentalized "silo thinking," have led to conflicting traffic and market shares for each mode. In reality, the modal share may decline and varies by corridor. Hence, the need to disaggregate traffic in practical terms, i.e., by transportation corridor for the different subsectors and framed by conditions in urban and subnational clusters. This is what VITRANSS 2 has done: break down the problems into tractable bytes.

7.10 The new planning does not take the projected traffic as inevitable or unavoidable, as these can be modulated by policies or shifted to another link and mode. Figure 7.2.1 illustrates the possible modal split under three scenarios. In all cases, there is no passenger traffic on coastal shipping; but if such a service emerged, then the shares for other modes would decline.

Figure 7.2.1 Passenger and Freight Transportation Demand by 2030



Source: VITRANSS 2 Study Team.

7.11 Aviation and inland water are especially vulnerable to future demand swings, and by extension, to strategy and policy changes. If energy prices return to their high levels and carbon limits are adopted globally, as is likely before 2030, air travel would skid. If coal is replaced in the future for environmental reasons, then projected loads on waterway and rail transportation would also dip.

3) Strategic Priorities for the Sector

7.12 VITRANSS 2 has assessed the performance of the transportation sector in some depth. Many good things are happening. Sector institutions and policies are being reformed and the legal basis for operations established, problems of increasing demand are often being met, and a policy for private sector participation is strongly supported, albeit at the early stages yet of development.

7.13 The challenges to the transportation sector can be summarized in the following table, which can also be seen—in obverse—as opportunities for the future.

Table 7.2.2 Transportation Sector Development Opportunities

Area	Current Challenge	Possible Action
1. Multimodal Planning & Investment	• Compartmentalized approach • Lack of certainty in priority & funding	• Ensure integrated multimodal planning • Utilize budget envelope to arrive at core priorities • Assess risks in funds programming
2. Sustainable Funding & Cost Recovery	• Limited funds for maintenance • Heavy reliance on ODA and borrowings	• Develop sound capital recovery framework (starting with Road Users Charge) • Promote private sector involvement
3. Seamless Movement & Supply Chain	• High logistics cost ~25% of GDP • Capacity development is too slow and insufficient	• Focus on bottlenecks of supply chain of 'export winners' • Reduce inventory cost • Promote 3PLs + entry of foreign players
4. Environment & Energy	• Possible negative environmental impacts of projects • Impacts to greenhouse gas and energy use	• Include mitigation measures in project designs • Provide disincentives to environment and energy inefficiency
5. Safety & Security	• High accident rates (esp. roads) • Vulnerability to disasters, in mountain and flood-prone areas	• Implement Traffic Safety Master Plan 2020 • Analyze risks and formulate mitigation measures, especially on trunk roads
6. Rural Accessibility	• Inaccessibility and disaster vulnerability	• Continue with funding social projects • Formulate mitigation measures for roads prone to landslides and flooding
7. Human Resource Development	• Legacy of centralized top-down planning	• Train in use of market mechanisms in transportation • Enhance capacity of Provincial Departments of Transportation (PDOTs)
8. Sector Governance	• Inadequate use of market forces • Low involvement of PDOTs	• Accelerate reforms toward market-based approaches • Devolve more roles to provinces in roads and IWT

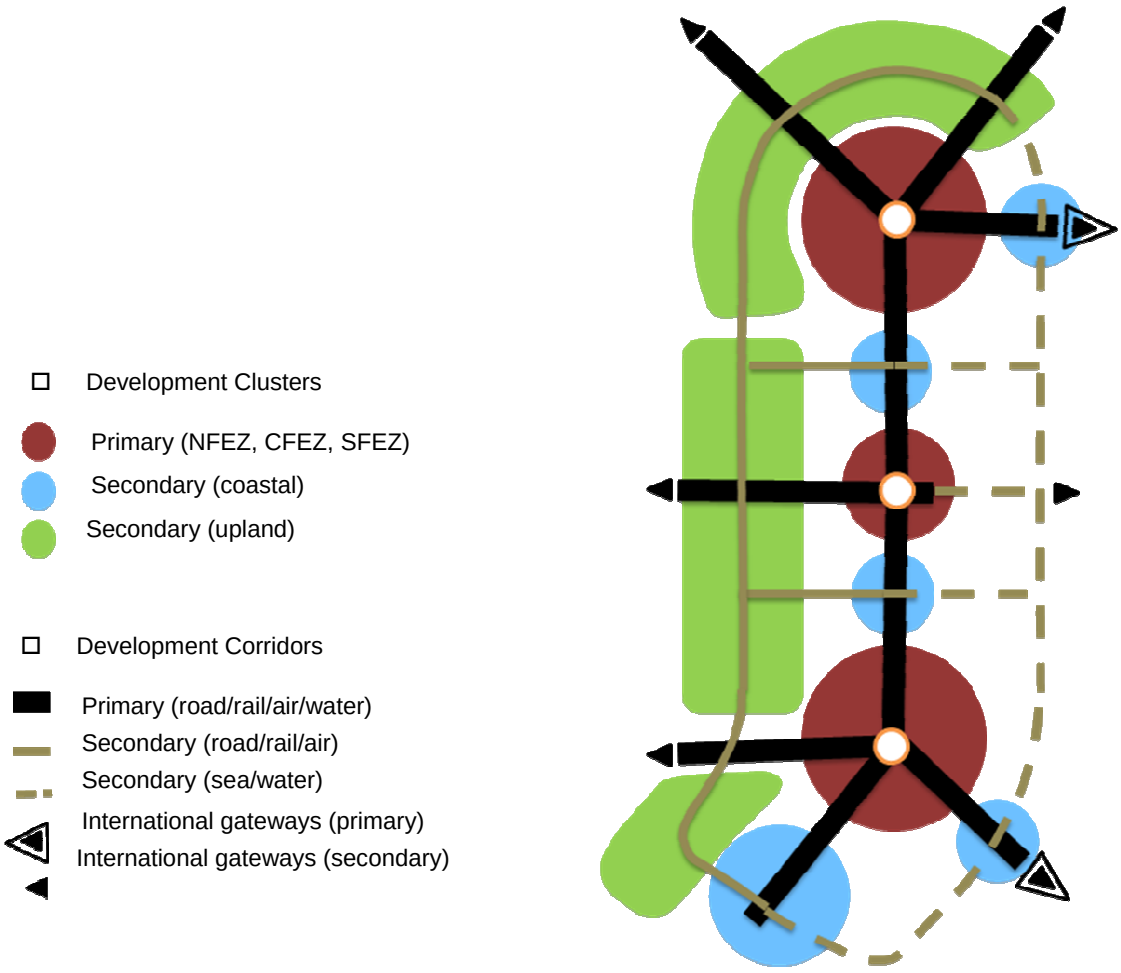
Source: VITRANSS 2 Study Team.

7.3 Overall Corridor Development Strategies

1) The Spatial Framework

7.14 While transportation follows the pattern of economic development, it also provides its contour and spatial distribution. On a macro-level, the transportation system will support and re-enforce the growth of three focal economic zones (schematically shown on Figure 7.3.1). The 3 urban clusters will be at the top of the hierarchy of human settlements to be supported and linked by high-capacity strategic network of expressways, express rail, coastal shipping, and air transportation, while at the same time functioning as international gateways.

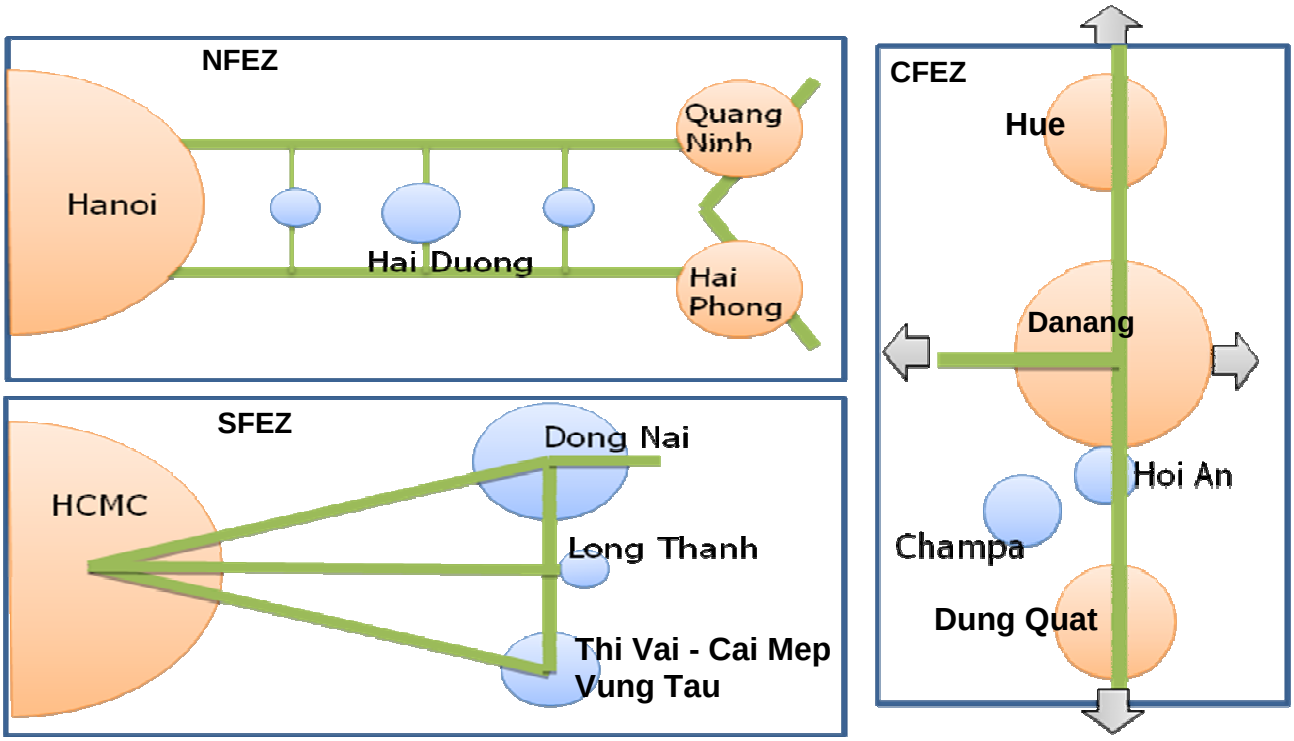
Figure 7.3.1 National Physical Framework



Source: VITRANSS 2 Study Team.

7.15 At the next level, each of the three urban clusters shall be the nucleus of development for their respective hinterlands, i.e., the adjoining provinces. Therefore, they must be provided with the corresponding second-level transportation infrastructure consisting of national and interprovincial roads, bus and possibly regional rail services and to some extent by air and inland waterway transportation. Figure 7.3.2 depicts the conceptual regional transportation structures.

Figure 7.3.2 Stylized Regional Transportation Structure



Source: VITRANSS 2 Study Team.

2) Corridor Integration

7.16 Within and between the FEZs, VITRANSS 2 adopted a corridor management approach in the detailing, evaluation and eventual operations of specific transportation projects. Corridors provide a practical application of multimodal planning in identifying improvements in intermodal networks that offer the greatest potential benefits to users of the network in terms of efficiency and quality of transportation services. The focus in every corridor is to increase mobility, safety and productivity; and this may include demand management measures, improvement of cross-network junctions, congestion management, and the like.

7.17 The different corridors examined by VITRANSS 2 are shown on figures 7.3.3 and 7.3.1. These can be grouped into five categories: National Backbone Corridor, International Gateway Corridor, Land Bridge Corridor, Regional Corridor, and Metropolitan Ring Corridor. Two mega-projects for the National Backbone Corridor was examined in more detail under VITRANSS 2, and discussed in later sections.

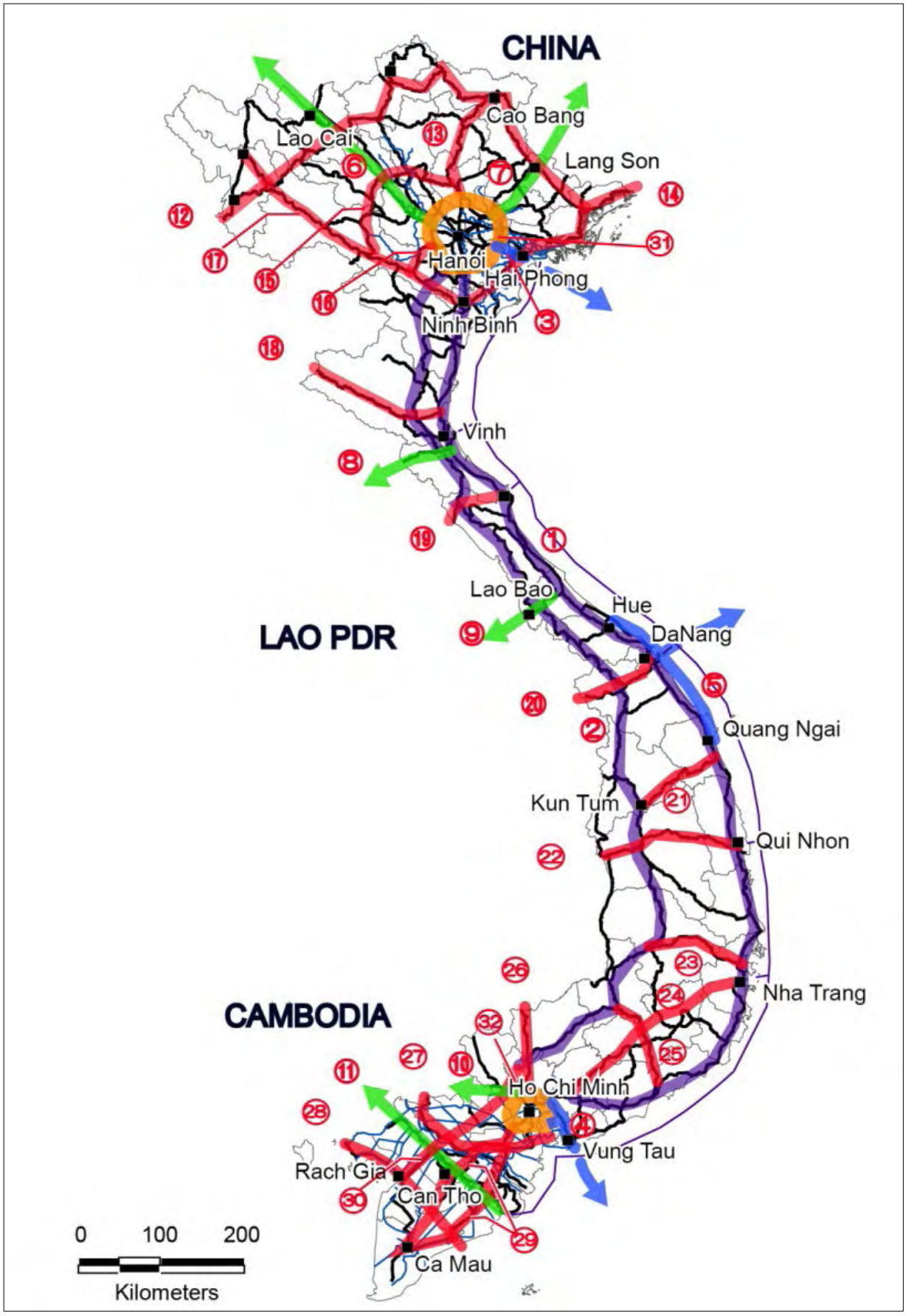
7.18 These corridors can be a useful construct (or framework) by MOT in pursuing a more active multimodal planning by deliberate seeking and evaluating of transportation modal alternatives in each corridor.

Table 7.3.1 List of Main Transportation Corridors

Corridor		Between	Distance (km)	Main modes
Type	Name			
National Backbone	1. North-South Coastal	Hanoi – HCMC	~1800	Rd, Ra, PS, A
	2. North South Upland	Hanoi – HCMC	~1800	Rd, A
International Gateway Corridor	3. NFEZ Gateway	Hanoi – Hai Phong	120	Rd, Ra, IWT
	4. SFEZ Gateway	HCMC –Ba Ria -Vung Tau	110	Rd, IWT
	5. CFEZ Gateway	Quang Ngai–Hue	190	Rd, Ra
Land Bridge Corridor	6. Hanoi – Lao Cai (China Border)	Hanoi – Lao Cai	260	Rd, Ra, IWT
	7. Hanoi – Lang Son (China Border)	Hanoi – Lang Son	145	Rd, Ra
	8. Vinh – NH8 – Lao Border	Vinh – Keo Noa	60	Rd
	9. Don gHa – Lao Bao	Dong Ha – Lao Bao	680	Rd
	10. HCMC – NH22 - Cambodia Border	HCMC – Moc Bai	70	Rd
	11. Soc Trang –Can Tho - Cambodia Border	Soc Trang – Chau Doc	180	Rd, IWT
Regional Corridor	12. North Frontier	Dien Bien Phu – Quang Ninh	500	Rd
	13. Hanoi – Cao Bang (China Border)	Hanoi – Cao Bang	220	Rd, (Ra)
	14. North Coastal (China Border)	Ninh Vinh – Mong Cai	260	Rd, IWT
	15. North transversal	Thai Nguyen – Moc Chau	200	Rd
	16. Hanoi – Hoa Binh	Hanoi – Muong Khen	60	Rd, IWT
	17. Ninh Binh – Lai Chau	Ninh Binh – Lai Chau	360	Rd
	18. Vinh – NH7 – Lao Border	Dien Chau – Nam Can	180	Rd
	19. Vung Ang – NH12 – Lao Border	Vung Anh – Cha Lo	60	Rd
	20. Da Nang – NH14B / 14D – Lao Border	Da Nang – Ta Oc	110	Rd
	21. Quang Ngai – Kon Tum	Quang Ngai – Kon Tum	120	Rd
	22. Quy Nhon – NH19 - Cambodia Border	Quy Nhon – Le Thanh	180	Rd
	23. Nha Trang – Buon Ma Thuot	Nha Trang – Buon Ma Thuot	130	Rd
	24. South Central Highland	Nha Trang – HCMC	300	Rd
	25. Phan Thiet – Gia Nghia	Phan Thiet – Gia Ngia	140	Rd
	26. HCMC – NH13 – Cambodia Border	HCMC – Hoa Lu	120	Rd
	27. HCMC – My Tho – Cambodia Border	HCMC – Tan Chau	220	Rd, IWT
	28. Bac Lieu – Rach Gia – Cambodia Border	Bac Lieu – Ha Tien	200	Rd
	29. South Delta Spine	HCMC – Ca Mau	250	Rd, IWT, A
	30. Upper South Delta	HCMC – Rach Gia	180	Rd, IWT, A
Metropolitan Ring Corridor	31. Hanoi Outer Ring		125	Rd
	32. HCMC Outer Ring		83	Rd

Source: VITRANSS 2 Study Team.

Figure 7.3.3 Transportation Corridors



Source: VITRANSS 2 Study Team

7.4 Subsector Development Strategies

1) Strategic Priorities for Roads

7.19 A network strategy shall strengthen the road hierarchy, improve overall capacity and avoid lopsided investments. This implies scaling down targets on expressways, scaling up primary and secondary roads to include ring roads around HCMC, Hanoi and other big cities such as Hai Phong, Danang and Can Tho, without sacrificing the rural roads programme of the government. The latter has proven to be instrumental in the rapid reduction of poverty in Vietnam. Only about 2% of communes remain without road access, but nearly half of the rural roads are subject to weather disruption.

7.20 The first priority for investment should self-evidently be maintenance of the existing assets. This would be followed by rehabilitation, then improvements (paving of about 2,700km of national roads and 7,900km of provincial roads), as funds allow. Apart from committed expressways, new roads should be last, with rural roads receiving priority over other 'missing links' in the main road network.

7.21 The creation of a road fund should be seen only as the first step of a long journey to road assets preservation. This should be followed by a systematic effort to curb truck overloading, and the adoption of a performance-based maintenance contracting regime.

7.22 Vietnam can lead the world in incorporating the special needs of motorcycles (and buses in urban roads) in new road construction as well as in road improvements. The reality is that 2-wheel vehicles will continue to grow, and is gaining acceptability as a sustainable mode of transportation in an increasingly carbon- and energy-constrained future. Traditionally, roads have been designed for 4-wheel vehicles, without regard to 2-wheels and mass transit. This will have the collateral benefit of reducing road safety hazards.

2) Strategic Priorities for Rail

7.23 A firm decision on the re-structuring of the Vietnam National Railways is needed. The old vertically integrated model will be a constraint to its future development. Separation of track infrastructure from operations is one business model, which seems to have been the basis for the recent decision to split the company into VNRA and VRC. The split, however, has been on hold, apparently due to some misgivings about the efficacy of the model. Whichever structure is finally adopted, swift action is imperative. This will remove uncertainties in many of its organizational plans and activities. It is a necessary condition to improve project implementation, not to mention transportation service. Without it, private sector participation would also not come in. The government should clear any stumbling block to the full realization of the 2005 Law on Railways.

7.24 There is no lack of plans and projects in railways; on the contrary, there are too many of them, but they are premised on a "do-maximum" strategy. Railway thinks it needs to be everywhere and must have the most modern technologies. Unfortunately, funds are inadequate to support this aspiration. Instead of a shotgun approach of trying to cater for everybody, the railway sector should target the specific market niches in which it has the best chance of becoming competitive—line, by railway line. For example, on the Hanoi-Haiphong Line, it will lose to trucking for freights, and to buses for passengers, especially when the parallel expressway gets built. VITRANSS 2 has identified a basic minimum package of improvement works; just enough to keep existing railway assets functioning at a capacity of about 50 thousand passengers a day. This can be farther decomposed and

prioritized to support the VRC's marketing plan. With additional funding, a second stage of railway improvements can be pursued involving system rehabilitation and selective double tracking that will result in step-increase in capacity to about 150 thousand passengers per day. A third stage of system modernization will entail substantial technology upgrades, and should be the last priority.

7.25 To carve out a significant role for railway in the future, it has to pay more attention to its weakest links – the transfer points with water (at ports) or land transportation (at freight yards). Small investment will go further through collaboration or joint-venture with rails' industrial clients, i.e., those customers (e.g., coal enterprises) who cannot easily shift their goods into competing modes. Another of rail's weakest link that needs to be given priority is the sections within the congested urban cores of HCMC, Hanoi, and Haiphong; they require either track elevation or relocation of alignment. Concurrently, it is likely to modify its infrastructure and inter-urban services in order to adjust to the realities of Metros.

3) Strategic Priorities for High-speed Rail

7.26 The HSR project is seen as important in overcoming the long distance that tends to separate the north from the south. It has been the subject of pre-feasibility studies, in VITRANSS 2 and in other initiatives, and the conclusions are similar: economic viability is marginal, even assuming extensive urban land developments at intermediate stops.

7.27 If built too early, the HSR project will undermine the viability of the Hanoi-HCMC express railway. Unlike similar ventures in other countries, staged development of Vietnam's HSR is difficult because demand is concentrated at two end points that are too far apart. As such, the full cost would have to be spent before ridership is known. It will attract some air travellers, and probably more from existing rail passengers. Few motorists drive between the two cities; and bus passengers have shorter trip lengths and a low value-of-time.

7.28 A more viable strategy is for the Hanoi-HCMC express rail to be completed first – before embarking on HSR. Megaprojects (like HSR and the Euro Tunnel) have a history of major overruns in implementation time and capital cost, and shortfall in forecast traffic. The downsides outnumber the upsides. A mega risk is only worth taking if the cost can be absorbed in case it is a mistake, but generates a lot of benefits when it is right. Unfortunately, the converse is true for HSR project; the cost is catastrophic for Vietnam if it turns out to be a mistake. Project cost is beyond any funder's—ODA or commercial banks—single-loan limit.

4) Strategic Priorities for Ports and Shipping

7.29 In view of the long gestation period for new deep-sea ports, the sector has no choice but to maximize productivity and throughput at existing ports. Additional berths and capacity can be extracted from the Dinh Vu in Hai Phong which has only four of its planned seven berths completed. Cai Lan and Cai Mep have yet to reach their limits and have spaces for expansion. Operational and systems improvement would require minimal investments. The use of ICT at these ports should be intensified, as it would also address a weak link in the logistics chain.

7.30 Based on demand forecast, port capacity expansion in the south is more urgent. This is occurring in Cai Mep–Thi Vai area.

7.31 The fascination with gateway ports should not detract from the necessity of reviewing existing port hierarchy. New common-user ports can be avoided with the expansion of ports hinterlands caused by road developments. Upgrading of ports (from a lower to a higher class) should be driven by plans of shipping companies. As the current global economic slowdown would favour regional (over transcontinental) trades, it behoves Vietnam to backpedal or be extra cautious on megaprojects like Van Phong Transhipment port. Such a hub port would not necessarily bring down shipping costs – which are determined by shipping cartels.

7.32 The human resource side of the maritime coin deserves more priority than the inordinate attention to more berths and bigger vessels. The skills of crewmen, officers, and management are below international standards – which explain the high detention rate. The problem will become more acute with fleet expansion, and as the industry becomes bigger, and as international shipping recruits more Vietnamese seamen. To be sure, the government has already launched training programs, and with foreign assistance is beefing up the capacity of VIMARU and MTTS.

7.33 In domestic shipping, a more level playing field can bring in more private sector investments that would accelerate fleet renewal and expansion – especially, if leveraged by a special window for ship-leasing. Container ships and RoPax in domestic shipping can benefit most from early liberalization.

5) Strategic Priorities for Inland Waterway

7.34 A sustainable scale of IWT network needs to be established – for each of the three IWT regions. This means small enough to be afforded, but large enough to ensure viability of strategic industries dependent on the waterways. The size of the network is likely to be largest in the Mekong Delta, smallest in the central region, and in totality, a smaller subset of the 6,574km of waterway currently under VIWA's scope. The selection of an irreducible set shall be driven primarily by demand and the characteristics of the waterway system in the respective regions. In order not to dissipate resources – financial and human – the regional waterway authorities should focus on the waterways per se, leave inland ports, barging, and ferry service to the province and/or private sector.

7.35 At the very least, the funding for maintenance of the above scale should also be stabilized – by creating a waterway maintenance fund, apart from annual budgetary support. Two complementary steps will make such a strategy feasible: (i) institutionalize the participation and involvement of industrial users of waterways in the management thereof, and (ii) a portion of the road maintenance fund (a major source of which is a levy on petrol and diesel) should be earmarked to IWT, and supplemented by a proposed riverfront frontage fees and annual fees on river vessels according to size and weight.

7.36 Given the vulnerability of waterways to nature's fury, the needs for unexpected repairs and maintenance will be real, and therefore require funding – which ideally must come from a special emergency fund.

7.37 As a matter of policy, inland and coastal ports should really be viewed as part of a system of ports, where smaller ones feeds into a bigger hub ports. No ports can survive without land access. Accordingly, greater attention should be given to the connectivity of roads and ports.

6) Strategic Priorities for Aviation

7.38 With the recent restructuring of air transportation institutions, the challenge has shifted into staff development to ensure that the institutions deliver on their mandates. Budgetary support for training in the fields of aviation security, safety management system (SMS), language proficiency requirements for airline crew and air traffic controllers, airport management and accident investigation - as per recommendation of an ICAO Audit Team - needs to be sustained.

7.39 The new structure has to be followed by a review of the cost recovery framework. As an independent regulator, the CAAV needs to establish proper charging system for various certifications and services. The same applies to the fees imposed by the three airport corporations. It is necessary to review and update charges to remove distortions. This can be the starting point for a sustainable financing scheme of most requirements of the subsector.

7.40 While the three regional airport corporations are free to expand capacities and/or build new airports, the CAAV should ensure that overlapping hinterlands is minimized and that the requirements of safe air traffic navigations are not sacrificed.

7.41 Self-evidently, it is necessary for each of the three FEZs to be served by a convenient international airport. Asia is expected to become the dominant economy in 20 years, and with it, greater reliance on air transportation for business and tourism. At present, there is no capacity problem - either in Noi Bai, Tan Son Nhat, or Danang. However, considering future demand, expansion should focus on: (i) a new passenger terminal building (T2) for Noi Bai; (ii) a new cargo terminal building in Tan Son Nhat.

7.42 A temporary slowdown in demand for air travel is foreseen in the next 3 years. This can be an opportunity to invest in selective upgrading in the other 18 domestic airports – if only to meet ICAO standards commensurate to classification. Along this line, Vietnam may consider adoption of its own airport development standards, using the ICAO as the template and modifying, where appropriate, to suit local conditions. It should include environmental standards on noise and aircraft emissions. Accessibility needs of disabled persons in each airport should also be stipulated, as this seems to have been overlooked in several airports.

7.43 Vietnam has taken the first step to introduce competition in domestic air transportation. A clear investment program on secondary airports development should guide current and prospective carriers on their respective expansion plans. Competition, however, will not be as efficient without a full review and rationalization of the charges they bear as airport users – including adoption of a more transparent method for cross-subsidy between profitable routes and 'missionary' routes. If an airline is obligated to provide scheduled services to domestic destinations not economically viable under regulated fare, then the government should bid out the service provision under a least-cost subsidy scheme.

7) Strategic Priorities for Logistics

7.44 Transportation is only one aspects of logistics, albeit the most significant factor (and perhaps, cost contributor). Previously, supply chain management was a principal concern only of companies engaged in global trade and manufacturing. Global competition, however, has placed logistics into the national policy agenda.

7.45 A multimodal framework is invaluable in identifying bottlenecks and weaknesses across the supply chain. Targeted intervention is the key to improving Vietnam's logistics performance rankings. According to the World Bank 2008 survey on logistics performance, domestic transportation cost is not the culprit in Vietnam but rather the poor timeliness of shipments that, in turn, leads to high warehousing and inventory costs. Creating electronic portals that can link the various logistics players (like freight forwarding, Customs, trucking, shipping, rail freight, manufacturers) is one intervention. Easing trade procedures across borders is another, since Vietnam ranked poorly on this dimension despite recent government initiatives.

7.46 Nurturing the growths of third-party logistics providers (3PLs) is also imperative in improving Vietnam's trade competitiveness. These enterprises are attuned to the just-in-time inventory practices of global trade. To bypass domestic shortcomings, multinationals often bring in their own 3PLs to ensure that their products get to markets on time, and their raw materials come in just in time. What policy measures will support 3PLs in Vietnam? These include liberalization of entry rules for foreign logistics players, revision of licensing rules hindering multi-service logistics businesses, and intensification of training in modern logistics as well as upgrading of staff competence.

7.5 Strengthening Sector Management

1) General Direction of Reforms

7.47 Institutions need to change in accordance with the challenges of executing new policies and new strategies. The transportation institutions of Vietnam are adapting – but not fast enough. A paradigm shift is required – from top-down to collaborative planning, from agencies that push to institutions that pull, from a regime where infrastructure is 100% provided by the State to where private sector participation is maximized.

7.48 'More of the same' cannot be a tenable strategy for the future, under any circumstances. There must be greater clarity in government transportation agencies, concentrating on what only they can do best. A new institutional model has been introduced in many countries, and is a sound basis for effective action. It involves transforming the public sector to the role of:

(i) Policy/Strategy Maker, in which government determines policy and strategy;

(ii) Regulator to create competitive markets - An economic regulator ensures market access and guards against abuse of monopoly behaviour, while a technical regulator determines common technical standards - where these are required - and ensures that safety standards are enforced;

(iii) Facilitator of increased private sector activity, ensuring that the institutional, policy and legal framework is right; and

(iv) Purchaser of services from the private sector, services that are socially or economically desirable, but not profitable.

(1) Changing the Boundaries of Public Sector Organizations

7.49 The government is undertaking a long term program to reform the 'Office of the Government' – which can be interpreted as encompassing all ministries and agencies, not just MOT. Reforming the public sector as a whole will create the environment for a more effective transportation management system. This should entail a review of responsibilities and a consequent 're-arrangement of the organizational boxes' – not only within one Ministry but also between ministries. Of particular relevance to roads is the overlap between MOT and MOC with regards to inter-urban transportation development. It is the opinion of VITRANSS 2 that transportation development – specially inter-urban and inter-provincial – be assigned to MOT, so that MOC can focus on construction per se.

7.50 Another sensitive and complicated relationship is between VINALINES and MOT. While the former was made to report to the latter for purposes of coordination, there is no direct administrative supervision. The complications can be minimized if VINALINES is made to concentrate on shipping services, and leave ports planning and development to MOT's VINAMARINE. In the long run, both agencies will be stronger by such division of responsibilities.

7.51 A third area involving interministerial boundaries is the registration of vehicles and licensing of drivers, which currently falls under the Traffic Police. It should be noted that in air and water subsector, such functions are assigned to the CAAV and VINAMARINE, agencies under the MOT. The Police would be more effective in enforcement, if the administrative task of registration and licensing is re-assigned to MOT.

(2) Implication of the New Model on Transportation

7.52 The implication of the above institutional model on the transportation sector is for government to withdraw from direct provision of transportation services such as what had transpired in trucking, taxi, river ferry, barging. The door has also been opened, albeit slightly, in aviation and shipping. The last holdout is railway, which is still fully public sector.

7.53 The provision of transportation infrastructure shall remain largely a government responsibility – with private sector coming in at the behest of, or in partnership with, the government. This is because the benefits from such infrastructure cannot always be captured directly from tolls or converted fully into revenues in a practical way.

7.54 To some extent, Vietnam has already started to restructure its transportation-sector institutions in accordance with the above model. In the past seven years, several laws have been enacted, among them are:

(i) Road Transport Law which was promulgated in 2001, then amended and supplemented in 2008;

(ii) IWT Law which was updated in 2004;

(iii) Rail Law which was ratified in 2005;

(iv) Maritime Code which was upgraded in 2005; and

(v) Aviation Law which was upgraded in 2006.

7.55 Apart from the laws, decisions and decrees that define the organizations of the transportation sector, there are legal issuances and circulars focusing on technical and economic regulations – some of which have elicited initial confusion, as maybe expected in effecting reforms. While laws have provided the broad framework for the sector, it is regulation that will provide the guidance for how the laws are to be interpreted and further, who and how it will be applied. It is on this aspect where institutions need to be trained – especially in understanding the functions of markets, and in treating SOEs as not more than equal to private enterprises in similar line of business.

(3) Rightsizing, not Simply Downsizing

7.56 In reforming the institutions, there will be painful adjustments in terms of staff reductions as Vietnam shrinks the role of the State sector. In the process, there is less work left to be done in the government as the private sector takes over functions and roles previously handled by the State. An example of this reduced role can be observed in Inland Water and Aviation – where private sector service providers have come in. Had there been no change, the employees of those enterprises would have been under State payroll and the investments taken out of the State budget.

7.57 But downsizing will not always happen. There will be less manpower in some areas where roles and functions have been reduced, but there will also be need for more (and of a different expertise) in other areas not previously attended to – such as in economic regulation and enforcement of safety regulations.

2) Lifting the Subsector Blinders

7.58 Subsector institutions are being strengthened as they should be, but multimodal planning is an orphan. Short of creating another layer of bureaucracy, the MOT should assume the role of multimodal planner – as befits a ‘holding’ company with many semi-autonomous ‘subsidiaries’. A simple but effective means of erasing the ‘silo’ thinking is to

require each modal-focused agency to challenge (or modify) what is proposed by the others, submit their own alternative (albeit, comparative) projects. This will force a consideration of all modal options – if not for the whole network, at least for every transportation corridor. In this way, a process of finding the least-cost transportation option for every corridor can be institutionalized. Lastly, MOT must examine any project's 'last-mile' problem, i.e., the interface between transportation modes – as this usually falls in the cracks, if not a "no-man's land" between subsector responsibilities.

(1) Coordination

7.59 Coordination is another mechanism for integrating plans and efforts of different subsectors. MOT needs to strengthen its role of a coordinator between subsector agencies, if not a referee to resolve the conflicts between them. Government actions, past and recent have created new, unexpected problems. In the road subsector, for example, the creation of VEC has led to a rapid rollout of expressway projects, but has undermined the role of GRA in maintaining a balanced and hierarchical road network. New urban rail entities have been created to 'make mass transit projects happen', but these have given rise to conflicts with the established railway entity. Ports are expanding their hinterlands due to increasing economies of scale and improvements in the road network, but new ports are being vetted elsewhere that will overlap with these hinterlands.

7.60 Whether the issue is a strategic seaports and airports policy for each of the three FEZs or Hanoi's urban transportation strategy, the minimum requirement is for coordination within the main government process. Without this, strategy is likely to become badly distorted. While all agencies may subscribe to coordination, in practice it is difficult to achieve. A coordinator is a like a conductor in an orchestra. In maritime, for example, MOT needs to orchestrate several players in ports and shipping. It can take the baton, and enable a system of ports hierarchy to emerge. At the top of the ports hierarchy are the three international gateway ports: Haiphong, Danang, and Cai Mep–Thi Vai. More than 60% of national capacity will be for the SFEZ, 30% for the NFEZ, and less than 10% for the CFEZ. Without the guiding hand of a Conductor, surplus capacities may co-exist with shortages.

(2) Investment Programming

7.61 Organizing a committee of stakeholders is the administrative method of coordinating several interested parties. This is not always effective, unless re-enforced in the budgeting process that results in a comprehensive 5-year rolling transportation investment programme. What is suggested here is to support the 5-year SEDP of the government with a 5-year Core Investment Program (CIP) in the transportation sector. It is suggested that the CIP process include the following features:

(i) Explicit prohibition against off-programme and off-budget items;
(ii) Recognition of funding limits (i.e., budget envelope) within the subsector;
(iii) Sharpening of cost estimates for projects in the list, i.e., supported by feasibility studies and basic engineering analysis;
(iv) Precedence of the programme over prior years' master plans, i.e., the CIP shall be taken as an official amendment of previous approvals; and
(v) Post-evaluation of some projects, to guide the formulation of the next 5-year rolling CIP.

(3) Monitoring System

7.62 A performance monitoring system needs to accompany the aforementioned CIP – so that their status, cost overruns, and implementation delays get resolved immediately. Monitoring, in turn, will require the adoption of performance indicators. The indicators can be derived from a Logical Framework Matrix (which the government has begun to adopt in project feasibility studies) for each project in the CIP. They should measure outcomes, more than inputs, and might include the following:

(i) Capital recovery ratio within the subsector;
(ii) Greenhouse gases per pax-km and ton-km;
(iii) Energy consumption by transportation mode;
(iv) Realization of planned investments, actual versus plan; and
(v) Accident rates by transportation mode.

3) A Better Way of Project Implementation

7.63 A more efficient form of executing construction works should be instituted within MOT and among its subsector agencies. This partakes of a 3-way contracting model – where the design engineer, construction firm, and owner are separate and independent from each other. An arms-length or impartial contractual relationships should exist between the three parties. When the three parties belong to the same group (i.e., part of the MOT family), a conflict of interest will always emerge. A long term solution to this dilemma is to equitize or move the engineering and construction companies out of the agencies' (and MOT's) paternal embrace.

7.64 Effective implementation also hinges on a resolution of the PMU issue. Ideally, when a project gets completed, the assigned Project Manager, who serves as the Owner's key man in the aforesaid 3-way model, is returned to his mother unit. Instead of keeping these experienced personnel in the dark after every assignment, they can be placed under a semi-permanent Project Management Bureau, a home base where the person is returned after project completion, and pending re-assignment to a new project.

7.65 The CIENCOs constitute the 3rd party in the above relationship. Similar to the PMU issue, a long-term solution to the "CIENCO problem" also needs to be formulated. A workable scheme is to equitize them one at a time starting with the most bankable and most attractive to the private sector. An open tender can be invited. But instead of the MOT or government identifying which of the CIENCOs would be placed in the auction block on a given year, it would be left to interested bidders. This should be a long-term program, with the government committing to abolish the last CIENCO left standing as an SOE. Bidders would naturally target the most efficient ones and with a good Balance Sheet.

4) Involving the Local Governments

7.66 A more effective sector management will, necessarily, require the involvement of provinces and municipalities and a clear division of responsibilities. There are transportation projects that should preferably be devolved to the provinces, instead of concentrating them at the top. These infrastructure are important in the local context, but not in the subnational or national context. For this reason, they can be transferred to local governments. Inland river ports and class 3 seaports fall into this category, as the justification for them are best appreciated at the local level. By doing less, the sector agencies can do more and be more effective.

7.67 There is another reason why local levels of government need to be involved. Although their revenues mostly come from fiscal transfers by the national government, the resources at the disposal of local authorities are substantial, from 20% to 50% of the USD33 billion estimated budget envelope in transportation. Some of the transportation projects in the past had a cost-sharing arrangement between national and provincial governments.

7.68 More than the burden-sharing, greater participation of local governments in transportation projects will lead to improved integration of transportation facilities with local land use plans.

5) Involving the Private Sector

7.69 In common with other economies that are becoming increasingly market-oriented, the role of government and the private sector is changing. The role of government is increasingly to enable competition for infrastructure services by private sector operators. The customers of the system are its users – passengers and freight users; and satisfying their needs has become the new focus. Increasingly Vietnam needs to attract private sector entrepreneurs to participate in its buoyant transportation sector. This represents a major challenge to the management of the sector.

7.70 The rationale for private sector participation (PSP) is to drive sector efficiency in many ways, encourage innovation, and secure additional sector financing when the private sector bears risks and PSP projects provide value for money. PSP is more than a means to raise additional financing for infrastructure. It is a major direction of change. All the evidence internationally supports this thrust, and Vietnam can benefit by fast-tracking its learning curve on PSP. This requires:

(i) Government to provide the framework to enable competition in infrastructure services between private operators. This requires the development of institutions, legislation and implementing rules, and the development and accumulation of experience in government in procuring private sector concessions. Experience suggests this will take 5–10 years from now to achieve;

(ii) International infrastructure operators need to be attracted to Vietnam's opening market. This requires market testing of PSP developments to ensure there are willing bidders for concessions;

(iii) Concessions should be trialled for necessary and high-profile projects with high PPP potentials, such as Terminal 2 of Noi Bai Airport; and

(iv) Public counterpart investment is necessary - international experience is compelling that very few so-called 'BOT' expressway or metro or HSR projects are financially profitable as stand-alone projects. Most create large benefits for non-users (e.g. reduced traffic congestion), and government's role is to invest to secure these other benefits. Greenfield private sector concessions usually require large public investment – hence, so-called 'BOT' projects are by no means cost freed from the government.

7.71 How much can be raised from private financing? This is likely to be modest at the beginning while institutions learn and because of the impact of the global financial meltdown on capital markets in Asia. On the first decade (2010–2020), about 5% to 10% of the CIP is a reasonable target. By the 2nd decade (2020–2030), this could jump from 20% to 35%. In other words, PSP will likely deliver increasing levels of sector financing in the medium and long-term. The pay-offs can be earlier, if the government process gets streamlined sooner. Institutional reform will take time before it can deliver a pipeline of 'good', funded projects

and attract the private sector in transportation infrastructure provision.

7.72 There are proposals for capacity building in PPP within MOT with the objective of promoting PSP in the transportation sector. This is laudable and should be pursued. It can study and learn from projects that bore the telltale signs of PSP, but heretofore not been recognized as such. Among these are:

(i) Phu Bai Airport in Hue, where Changi Airport of Singapore is reportedly investing;

(ii) Dinh Vu Port in Hai Phong, where a foreign consortium led by APMT of Denmark is funding up to 70% of the port-cum-industrial estate project;

(iii) Cai Mep–Thi Vai Port in where PSA of Singapore and Hutchinson Port Holdings are investing USD165 million in phase 1, and another USD133 million in Phase 2. Other private groups (e.g., SSA Marine of USA, and CMA-CGM of France) have been reported to be following suit; and

(iv) Hiep Phuoc Port in HCMC where Dubai Port is reportedly investing USD100 million.

7.73 To create a more hospitable environment for PSP, two concrete measures might be considered: (i) the use of market-based financing, and (ii) hybrid ODA and PSP. The first would encompass a wide range of methodologies such as corporatization and public offering of infrastructure operating company, strategic partnership to form joint ventures to build and operate transportation infrastructure, and so on. This can piggyback on the equitization of key SOEs. The underlying principle is to tap funding for the development and operation of transportation infrastructure from the capital market in the form of equity and various form of borrowing such as loan, debentures and notes issuance. It would appear that the Vietnam Expressway Corporation is structured in this manner.

7.74 The second measure is to utilize ODA financing towards mitigating the viability-gap risks faced by many BOT projects in Vietnam. Transportation assets can be unbundled into several pieces as illustrated in Table 7.5.1.

Table 7.5.1 Managing Viability Gap Risk in PSP Projects

	Port	Air Port	Highway	Railway
Private	Gantry Cranes/Operating Equipments	Terminal	Toll Facilities/Pavement	Rolling Stocks/EMS
Public	Berth	Runway	Structure, Civil works	Structure, Civil works

Source: VITRANSS 2 Study Team

7.6 Budget Envelope

1) Available Public Funding

7.75 VITRANSS 2 has prepared estimates of future public funding under three scenarios for the future GDP growth rates and also three scenarios for the percentage of GDP that can be spent for transportation sector investment. The former assumes:

- Annual GDP growth rate for 2011–2020: 5.5% (Low), 6.5% (Medium), 7.5% (High)
- Annual GDP growth rate for 2021–2030: 4.5% (Low), 5.5% (Medium), 6.5% (High)

7.76 And the latter, the share of GDP for transportation sector investment: 3% (Low), 5% (medium), 7% (High).

7.77 Table 7.6.1 presents the possible public investment amount for the transportation sector. As economy grows, the amount increases in an accelerated manner.

Table 7.6.1 Possible Public Investment for the Transportation Sector by Period

(USD billion at 2006 prices)

Period	Possible Investment as % of GDP								
	3			5			7		
	Low	Med	High	Low	Med	High	Low	Med	High
2009&2010	5	5	5	8	8	8	11	11	11
2011-2015	14	15	15	24	24	25	33	34	35
2016-2020	19	20	22	31	33	36	43	47	51
2021-2030	53	61	72	89	102	120	124	143	168

Source: VITRANSS 2 Study Team

2) Budget Envelope

7.78 As can be seen from Table 7.6.2, the estimated size of the "budget envelope" ranges from a low USD37 to a high of USD96 billion for the master plan period 2009–2020. For the long-term vision period up to 2030, this amount further grow to USD91–264 billion with additional USD53–168 billion for the decade 2021-2030.

Table 7.6.2 Estimated Public Funds Available for Transportation Sector

(USD billion at 2006 prices)

Period	Possible Investment as % of GDP								
	3			5			7		
	Low	Med	High	Low	Med	High	Low	Med	High
2009-2010	5	5	5	8	8	8	11	11	11
2009-2015	19	19	20	31	32	33	44	45	46
2009-2020	37	39	41	62	65	69	87	91	96
2009-2030	91	100	113	151	167	189	212	234	264

Source: VITRANSS 2 Study Team.

7.7 Constraints and Opportunities for Infrastructure Funding

1) The Funding Problem

7.79 Public sector funding is not limitless. Government can borrow but this simply transfers the burden to future generations, and is therefore not sustainable in the long term. There are also other important services and sectors that compete for public funds. The transportation sector is only one of them, albeit an important one. Increased funding for transportation, therefore, will not be significantly deviate from historical trends.

7.80 Vietnam's development creates large demands for transportation investment in maintenance, upgrading and new projects. The combined requirements of all proposed projects amount to about USD175 billion, excluding the HSR and those without cost estimate. On an annual basis, the requirement is about USD17 billion a year from 2011 to 2020. In comparison, actual investments in the last few years only averaged USD0.9 billion a year. What this implies is that only modest levels of financing of approximately 10% will be available compared to requirements. The global economic crisis of 2008 has only made the situation worse.

7.81 Therefore, increasing sector financing must be part of transportation strategy. Increasing user charges (e.g. the recently announced Road Fund) and private sector participation (PSP) are practical ways of raising sector funds whilst also supporting economic efficiency. But PSP will take time to implement, maybe 5–10 years. During this transition period it seems inevitable that sector funding will need to be a combination of:

(i) Public sector budgets, sourced from taxes and bonds;
(ii) Official Development Assistance, like JICA, IBRD, ADB;
(iii) Tolls and other forms of direct user charges, which are still insignificant; and
(iv) Bilateral aids and grants, which are usually small and restricted.

7.82 The total tax revenue from newly purchased vehicles and fuel is roughly estimated at about USD 500 billion for the period 2010-2030, assuming VAT at 10% on car and fuel, consumption tax on car at 45% and import tax on fuel at 35% (tax rate as of July 2009). This is well larger than the budget envelope mentioned above. If this revenue, even a certain percentage, could be earmarked for selected purposes of the transport sector such as road maintenance and promotion of private sector participation, the burden shouldered by the state budget will be much more alleviated. Moreover, by strengthening this economic mechanism, the use of private mode of transport may be controlled as advocated by Decision No.153/2004/QD-TTg.

2) Asset Maintenance Fund

7.83 The maintenance of roads, waterway, and railway tracks is often under allocated during budgeting negotiation. The budget for maintenance suffers even more when there is overall funding constraint. This is unfortunate because typically maintenance yields the most benefits for less cost than a new transportation project. While it is the cheapest form of investment, maintenance does not get the political attention as a new project.

7.84 Recently, the National Assembly has approved the establishment of a road maintenance fund to be funded by a levy on petrol and diesel, registration fees from motor vehicles, a levy on sale of automobile tires, parking and warehousing fees, and fees from the issuance of driving licenses. However, there are still no implementing details.

7.85 The approval of a fund, however, represents an opportunity to raise and stabilize funding for road maintenance. With proper design, it can be an effective instrument and

should preferably include other disadvantaged transportation assets like waterways.

3) Private Sector Participation

7.86 The rationale for PSP is to drive sector efficiency, encourage innovation, and secure additional sector financing when the private sector bears risks and PSP projects provide value-for-money. PSP is more than a means to raise additional financing for infrastructure. It is a major change of direction. Where the private sector assumes the burden, the funding is considered 'additional' to public funding (e.g. BOT projects). In this case, it is still users who pay, through tolls and tariffs.

7.87 Effective PSP delivers private financing. When there is effective risk transfer, private financing is its consequence, and subject to safeguards that it provides value-for-money (when compared against public sector delivery), PSP will likely be very beneficial. Of course private financing is not 'free funding'. The private sector provides up-front financing to be repaid by users of the system. In many cases, it also requires partial funding from the government as to become a PPP (public-private-partnership) arrangement. A major thrust of transportation strategy therefore is to deploy PSP more effectively.

7.88 A number of developing countries had assumed that PSP will become a deluge after a BOT Law is enacted. It did not happen because the regulatory and institutional reforms within that sector were not conducive to private sector participation aside from the fact that there were not many projects for the private sector to consider. Not all transportation infrastructure projects are suitable for PSP.

7.89 If transportation projects were profitable, the transportation budget could enlarge because it would attract additional funds from the private sector. But this is not the case wherein very few transportation projects are profitable.

7.90 Many projects produce large benefits for other transportation users and they cannot be expected to be profitable based only on user tolls and tariffs. But the consequence is of the first importance: only exceptionally will major transportation infrastructure projects be profitable. The vast majority will require the government to contribute funding, either directly through the provision of investment subsidies or indirectly by providing guarantees.

7.91 There is a second problem. It has proved very difficult, just about everywhere, to implement BOT projects. Government agencies were unprepared to adapt, acquire the necessary skills, and become more business-friendly. This will slowly change. However, considering the poor prospects for profitability, it should lead to considerable caution in assuming that private sector participation will produce rapid progress, or be 'the funding solution'. In short, private sector BOT projects do not provide an easy answer to the funding problem.

7.92 PSP implies non-State budget sources. There is unsupported optimism in Vietnam about PSP prospects to the extent of expecting. 40% contribution, as envisaged in the 2004 National Transportation Development Strategy document. For reasons stated above, this is unrealistic, and unlikely to be realized. Due to the global economic crisis of 2008, investor interest for infrastructure projects would also be poor in the next two years. The good news is that Vietnam actually has some experience on PSP. Seaports (VICT, Hiep Phuoc Port, Dinh Vu, Cai Mep Thi Vai) have attracted PSP for several years. The multiplicity of players, the obvious unmet demand, and implicit competition between them may have all been instrumental. An independent study may be necessary to identify the factors that made them possible and to adapt them into the other transportation subsectors.

4) Carbon Trading Mechanism

7.93 Since the 1987 report entitled “Our Common Future” came out, the central importance and inter-onnected dimensions of sustainability have slowly gained prominence. Not only is this a necessary national goal, it has become an urgent global imperative. Controlling greenhouse gases (GHGs) by greater energy efficiency and changing the energy mix have particular implications for the transportation sector that remains heavily dependent on CO_2-intensive fuels. Solutions require a holistic approach to land use development and accessibility, and energy efficiency.

7.94 Vietnam would be joining this ‘green imperative’. The only question is when and how fast Vietnam would have to move in concert with the international community, in the directions indicated in Table 7.7.1.

Table 7.7.1 Policy to Tackle Climate and Energy

Fuel/ GHG Emissions =	No. of Vehicles X	Km/vehicle X	Fuel/ GHG Emissions/veh-km
1. Policy Implications	• Reduce need for travel • Influence mode choice	• Increase urban densities	• Regulate vehicles and fuels • Manage traffic
2. Examples	• Support NMT	• Plan for city expansion	• Regulate vehicle efficiency
	• Improve bus operations	• Target smart growth	• Introduce efficient/non-carbon fuels
	• Segregate buses		• Control in-use emissions
	• Introduce demand management		• Manage road traffic

7.95 The above policies may seem to constrain transportation. In the long term horizon, they also represent opportunities for infrastructure funding. ODA would shift their priorities towards projects that reduce GHG. Imposition of a carbon tax would probably become necessary, and politically acceptable, in the future. The proceeds can be channelled back to maintenance of transportation assets.

7.96 An obvious opportunity is to convert the 18 million or so motorcycles to use electricity or LPG. Aside from its environmental benefits to urban areas, the carbon credits that it generates can be converted into cash via the Asian Carbon Trading market and use to subsidize or fund the conversion. One study on motorcycles in Bangkok found out that a 4-stroke motorcycle emits 8.38 grams/km of hydrocarbon and 16.69grams/km of carbon monoxide.[1]

7.97 Emission trading is an administrative approach used to control pollution by providing economic incentives for achieving reductions in the emissions of pollutants. It is sometimes called cap and trade where a central authority (usually a government or international body) sets a limit or cap on the amount of a pollutant that can be emitted. Companies or other groups are issued emission permits and exceed the cap, limiting total emissions to that level. Companies that need to increase their emission allowance must buy credits from those who pollute less. The transfer of allowances is referred to as a trade. In effect, the buyer is paying a charge for polluting, while the seller is being rewarded for having reduced emissions by more than was needed. Thus, in theory, those who can easily reduce emissions most cheaply will do so, achieving the pollution reduction at the lowest possible cost to society.

[1] Shing Tet Leong, et.al. “Evaluation of Air Pollution Burden from Contribution of MC Emission in Bangkok”, AIT (Aug 2000).

5) A More Rigorous Project Screening

7.98 The proliferation of projects inevitably bloats the investment requirements by a large multiple against budget envelope. This should be seen as an opportunity to subject all projects to a more rigorous selection process so that those showing higher-value-for-money gets the priority. A better method for selection and ranking of projects might incorporate the following:

(i) Projects costing more than a threshold amount (say, USD50 million) must have updated feasibility studies, before inclusion of the project in the annual capital investment budget;

(ii) Large scale projects (e.g., those costing more than $250 million) should be subjected to a project challenge from other transportation subsectors to force a multimodal focus and consideration of the right transportation mode for the market segment.