4 TRANSPORTATION STRATEGY

4.1 Basis of Transportation Sector Strategy

1) Fundamentals of VITRANSS 2 Strategy

4.1 Sustainable transportation development aims to support and promote the national growth and poverty reduction strategy. Sustainability refers to economic, social, environmental, financial and administrative aspects, improving critical assessment of demand, efficiency and effectiveness (competitiveness), affordability, funding capability and management capacity. The fundamentals of the VITRANSS 2 strategy are as follows:

(i) Development of competitive intermodal transportation network and service at national/international level (national backbone network);

(ii) Development of effective local transportation network and services integrated with the above national/regional transportation system at provincial level;

(iii) Development of step-wise and incremental investment strategy with a core investment program at its center;

(iv) Budget allocation to more closely support the objective assessment of sector priorities;

(v) Development of PSP to drive the strategy, increase sector efficiency and stimulate innovation; and

(vi) Institutional reform to better address and align government goals with outcomes.

2) The Spatial Framework

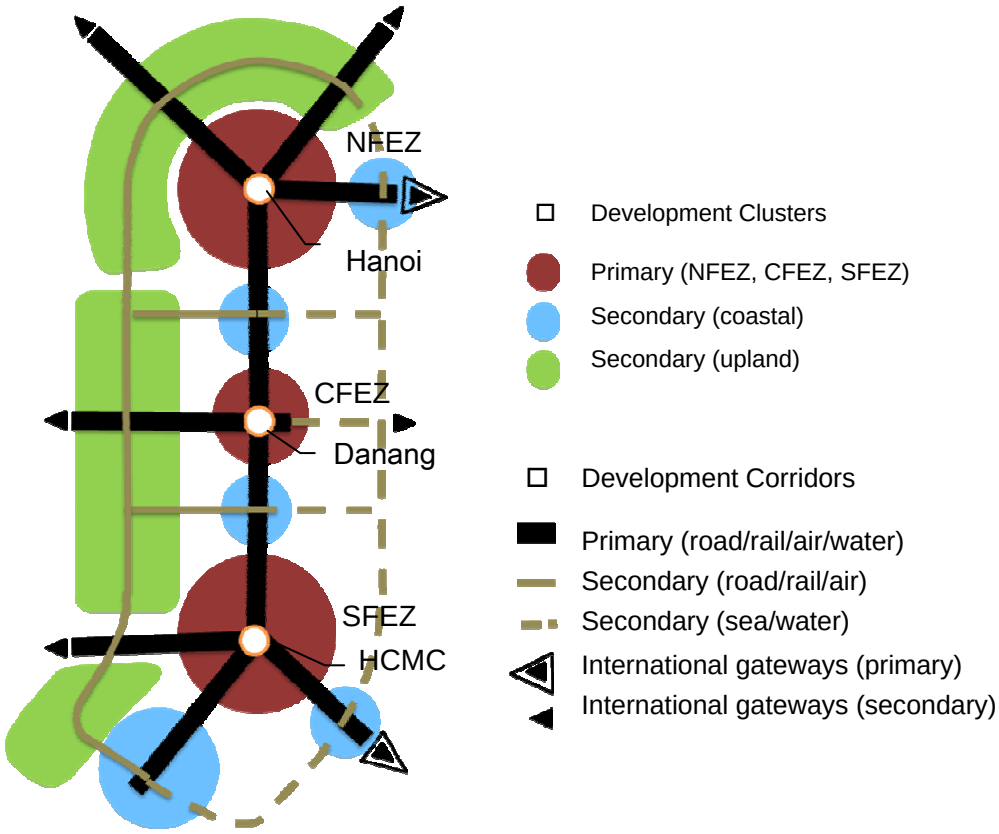
4.2 While the transportation sector follows the patterns of economic development, it also provides its own contour and spatial distribution. On a macro-level, the transportation system will support and re-enforce the growth of three focal economic zones (schematically shown on Figure 4.1). The 3 main urban clusters are at the top of the hierarchy of human settlements, and will be supported and linked by a high-capacity strategic network of expressways, express railways, coastal shipping, and air transportation, while at the same time functioning as international gateways.

4.3 At the next level, each of the three main 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 secondary-level transportation infrastructure - consisting of national and interprovincial roads, bus and possibly regional rail services, complemented to some extent by air and inland waterway transportation linkages. Figure 4.2 depicts the conceptual secondary level regional transportation structures.

3) Transportation Corridor Integration

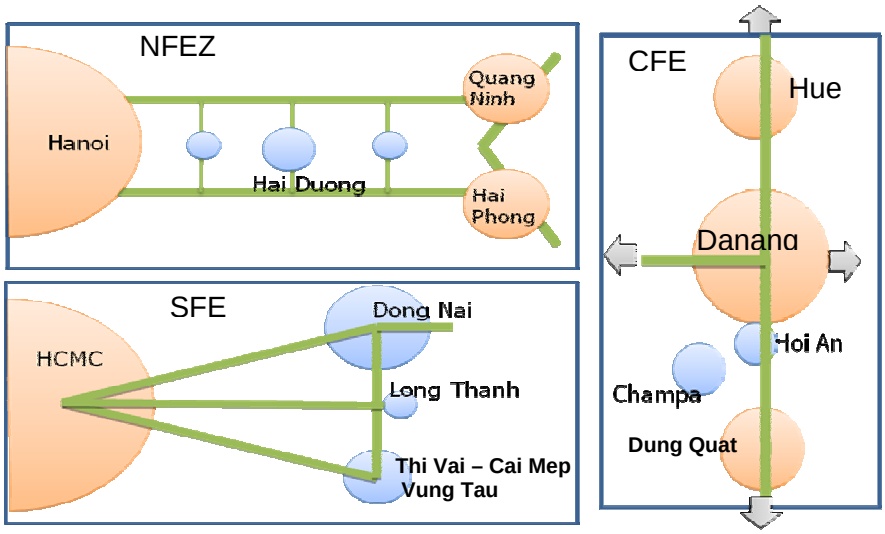
4.4 Within and between the focal economic zones (FEZs), VITRANSS 2 adopted a corridor management approach in the planning, evaluation and eventual implementation of specific transportation projects. Transportation corridors provide a practical application of multimodal planning in identifying improvements in inter-modal 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, etc.

Figure 4.1 National Physical Framework



Source: VITRANSS 2 Study Team.

Figure 4.2 Stylized Regional Transportation Structure



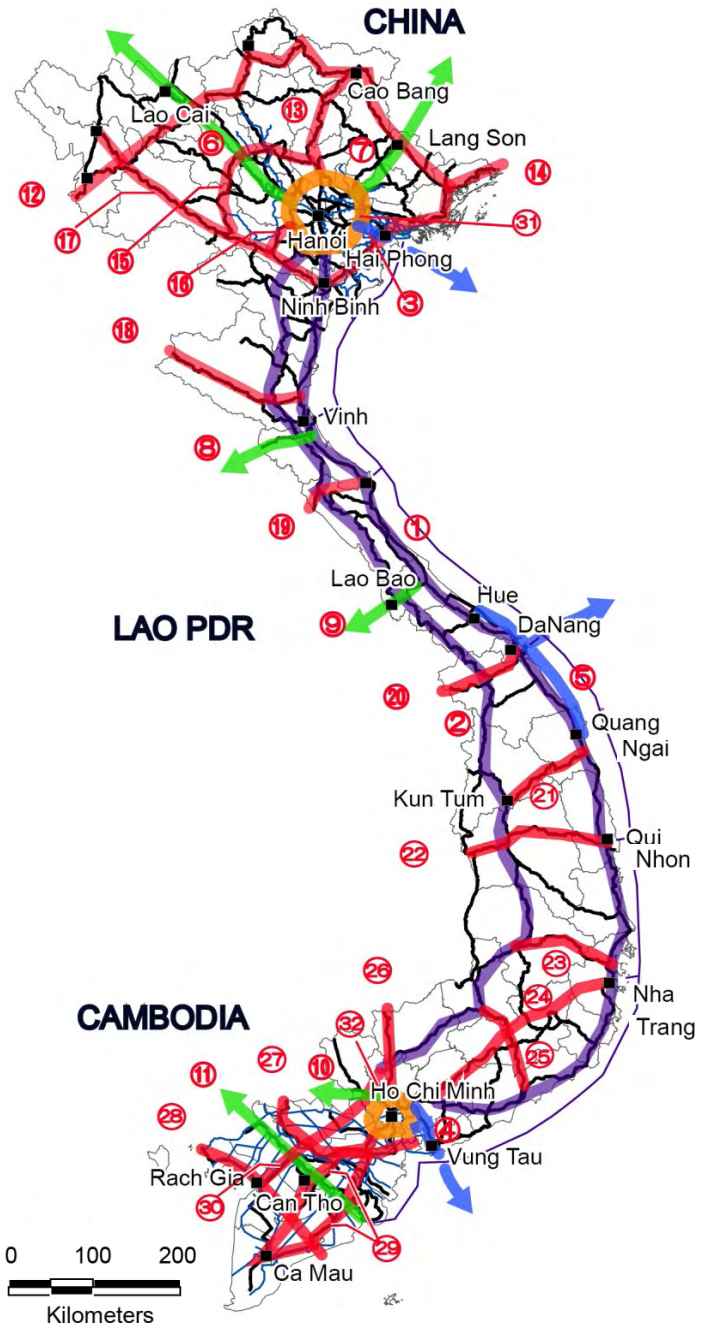
Source: VITRANSS 2 Study Team.

4.5 The different corridors examined by VITRANSS 2 are shown on Figure 4.3. These can be grouped into 5 categories: National Backbone Corridor, International Gateway Corridor, Land Bridge Corridor, Regional Corridor, and Metropolitan Ring Corridor. Two megaprojects for the National Backbone Corridor have been examined in more detail under VITRANSS 2, and are discussed in later sections.

Figure 4.3 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 Ha – 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.
Note: Road (Rd), Rail (Ra), Inland waterway (IWT), Port and Shipping (PS), Air (A).



4) Baseline Analysis

4.6 The "Do-nothing Scenario" was analyzed by assigning future traffic demand on the existing transportation network. The results indicate where capacities may be lacking and bottlenecks will appear. The analysis was made both for passenger and freight transportation for related modes. The main findings are below (see figures 4.4 and 4.5):

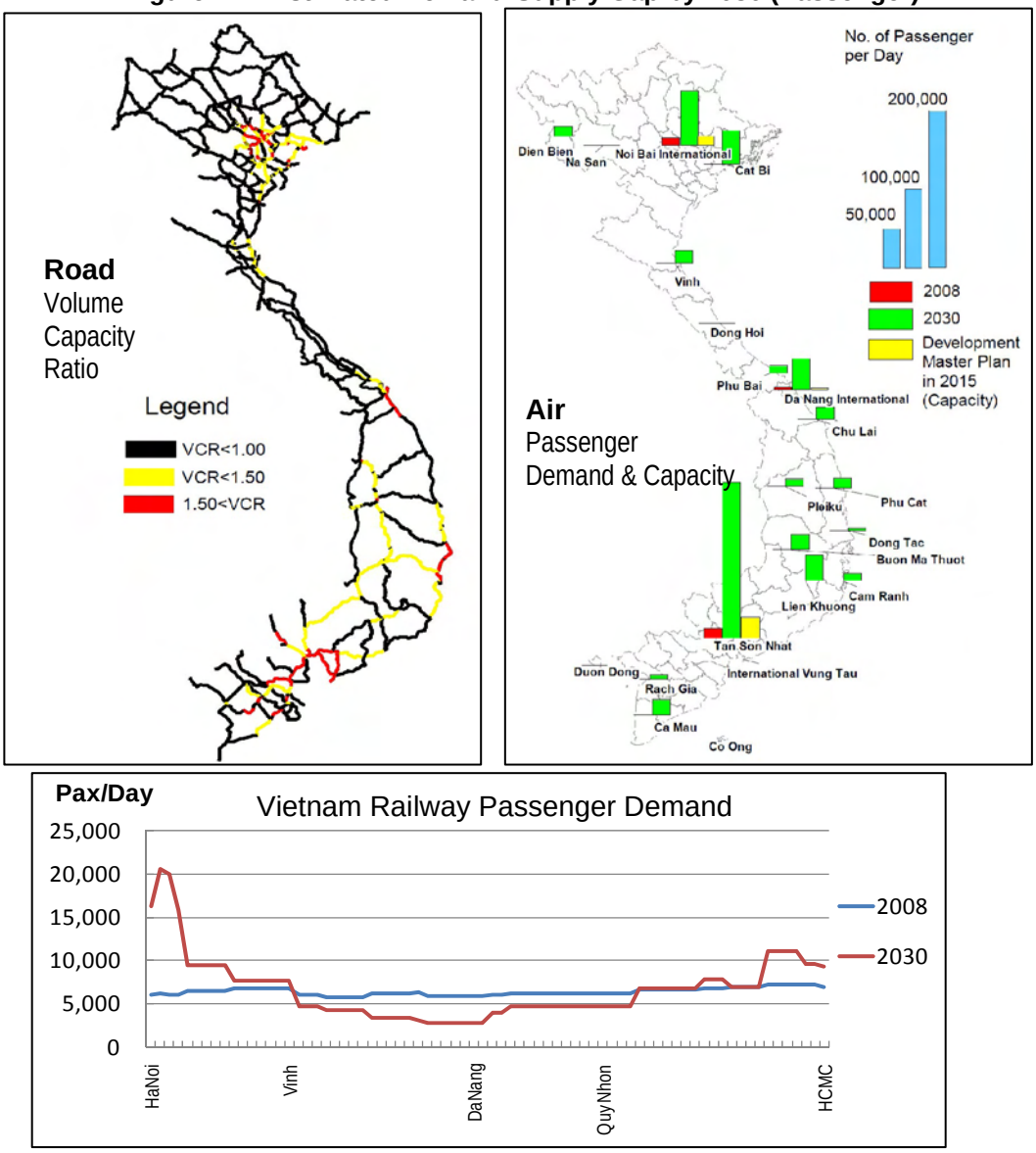
(i) Passenger Traffic

- Road capacity will become insufficient in many areas in the country by 2030;
- VNR capacity around Hanoi and HCMC will fall short; and
- Capacity of the three large airports and other local airports will be inadequate.

(ii) Freight Traffic

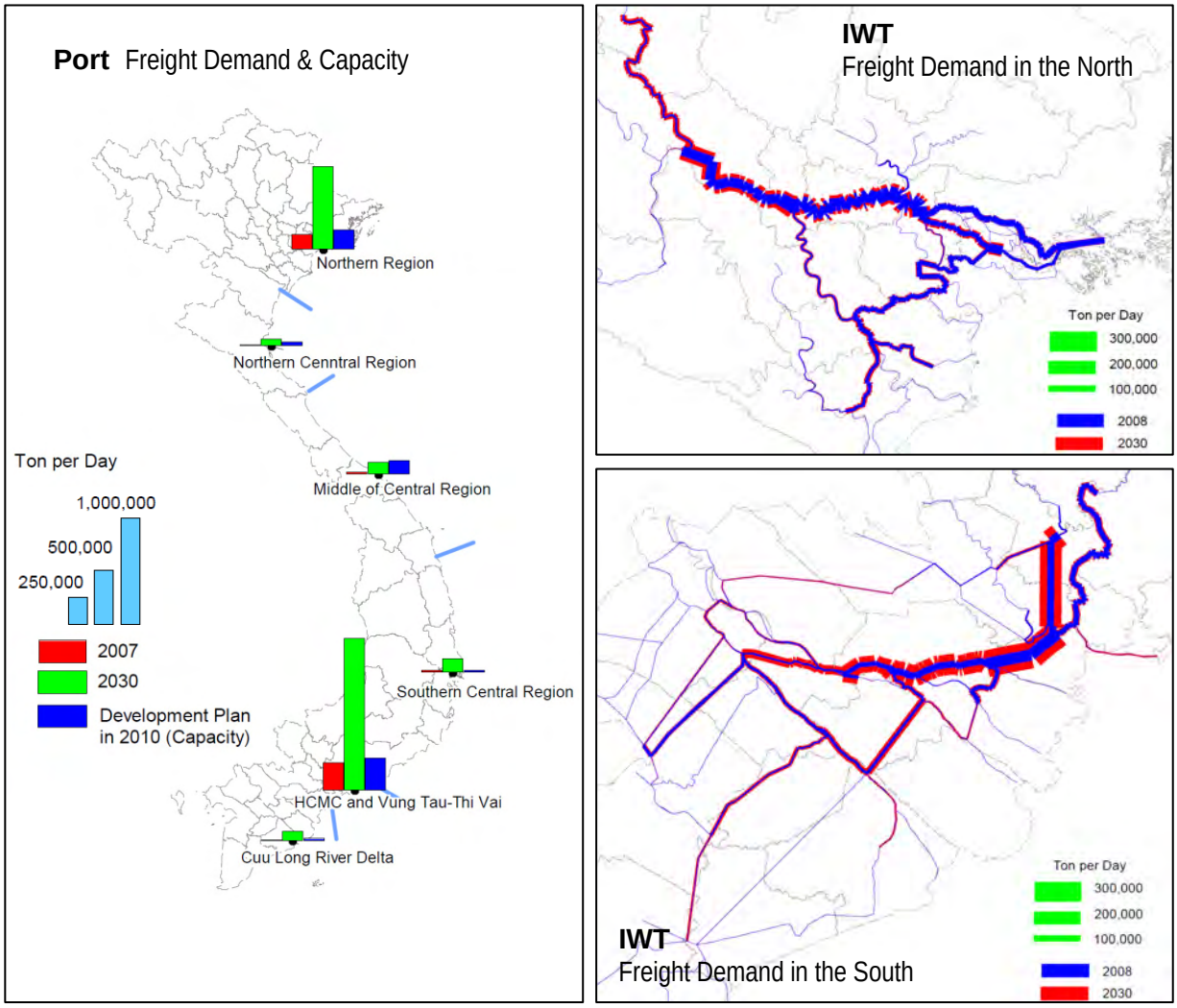
- Freight transportation demand for VNR will grow drastically in the future. If no improvement is done for VNR, the demand will shift to road and partially to shipping;
- Demand for IWT will increase particularly in the Mekong delta; and
- Port capacity in most port groups may be insufficient by 2030.

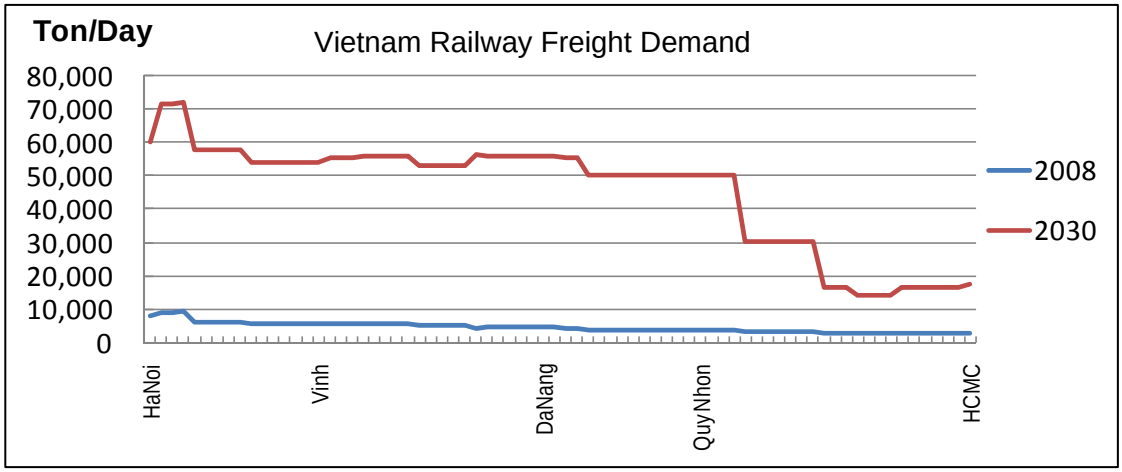
Figure 4.4 Estimated Demand-Supply Gap by 2030 (Passenger)



Source: VITRANSS 2 Study Team

Figure 4.5 Estimated Demand-Supply Gap by 2030 (Freight)





Source: VITRANSS 2 Study Team.

4.2 Overall Transportation Sector Strategy

4.7 In order to attend to large and diversified transportation demand which requires not only sufficient capacity but quality of services, there is a need for further modification of focus and infrastructure policies as well as the strengthening of integration and coordination, as shown in Table 4.1. The priority strategies for transportation development in Vietnam are shown in Table 4.2.

Table 4.1 Change in Focus of Transportation Development

Area	From the Present	To A New World
1. Focus	• Unimodal • Stand-alone projects • Supply-driven Lack of certainty in priority & funding	• Multimodal • Supply-chain orientation • Demand-driven
2. Infrastructure Policies	• Priorities are sector-based and political balance • Concentration on capacity • Ambiguous priorities and funding • State as provider of services	• Transparent competition among modes for funds • More focus on productivity and market orientation • Long-term strategic prioritization and fund sourcing • Private sector as provider of services
3. Integration & Coordination	• Sectoral planning • Disconnect between transportation and regional and urban strategies • Heavy reliance on State intervention for coordination	• Multimodal planning • Harmonization between transportation and development strategies • Use of market mechanism to influence demand & supply

Source: VITRANSS 2 Study Team.

Table 4.2 Priority Transportation Strategies

Area	Current Challenge	Possible Action
1. Multimodal Planning & Investment	• Compartmentalized approach • Lack of certainty in priority & funding	• Ensure integrated multimodal planning • Consider budget envelope • Assess risks in fund programming
2. Sustainable Funding & Cost Recovery	• Limited funds for maintenance • Heavy reliance on ODA	• 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 approach is too slow and insufficient	• Focus on bottlenecks of supply chain • Reduce inventory cost • Promote 3PLs + entry of foreign players
4. Environment & Energy	• Possible environmental negative impacts of projects • Impacts to greenhouse gas and energy use	• Mitigate impacts • Provide disincentives to environment and energy inefficiency
5. Safety & Security	• High accident rates (esp. roads) • Vulnerability to disasters	• Implement Traffic Safety Master Plan 2020 • Analyze risks and formulate mitigation measures
6. Rural Accessibility	• Inaccessibility and disaster vulnerability	• Continue with funding social projects
7. Human Resource Development	• Centralized planning	• Train on use of market mechanisms • Enhance PDOT capacity
8. Sector Governance	• Inadequate use of market forces • Low participation of PDOTs	• Accelerate reforms towards market-based approaches • Strengthen role of PDOTs

Source: VITRANSS 2 Study Team.

4.3 Roads Subsector

1) Key Issues

4.8 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).

4.9 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.

4.10 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.

4.11 Road maintenance is thought to be substantially under-funded, but little is known about quantification of the scale and nature of the problem based on assessment of road conditions, rate of deterioration, and appropriate remedial treatments. It was reported that maintenance of national roads alone will require USD195 million in 2005. Anecdotal evidence is that many roads are relatively new and here present maintenance needs are negligible. But in 5–10 years time there will be a step-change in the scale of the problem, and already on older roads problems are becoming obvious. 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.

4.12 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 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 current level of expenditures on road maintenance.

4.13 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) Strategic Priorities

4.14 A network strategy shall strengthen the road hierarchy, improve overall capacity, and avoid lopsided investments. This implies scaling down targets on expressways and scaling up primary and secondary roads to include ring roads around HCMC, Hanoi, and other large cities such as Hai Phong and Danang. The development of bypasses for many medium-sized cities located along busy national roads has become increasingly important to segregate interprovincial and urban traffic, The existence of roads 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 rural roads are vulnerable to weather disruptions.

4.15 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 2,700 km of national roads and 7,900 km 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.

4.16 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.

4.17 Two wheeled vehicles will continue to increase in number, and to gain acceptability as a sustainable mode of transportation in an increasingly carbon- and energy-constrained future. Traditionally, roads have been designed for usage by 4-wheel vehicles, without regard for 2-wheel traffic and mass transit systems.

Table 4.3 Subsector Strategies: Roads and Road Transportation

Goal	Specific Action
1. Improve road network capacity thru proper hierarchy and connectivity	• Balance expressways, primary, and secondary roads • Upgrade road surfaces to all-weather pavements • Intensify development of provincial roads in coordination with national roads
2. Segregate traffic to enhance safety and productivity	• Develop design standards suited to motorcycle traffic • Segregate long distance heavy vehicles from local traffic
3. Preserve road assets	• Negotiate long–term maintenance program and road user funds • Strengthen institutional mechanism and capacity • Intensify regulations on truck overloading
4. Foster environment and safety safeguards in road transportation	• Constantly review vehicle /safety standards • Improve design standards on landslide/flood-prone areas • Continue to implement road safety promotion programs
5. Modernize road sector industries	• Modernize transportation operators and foster business environment • Promote high-quality road construction through reforms in the procurement system

Source: VITRANSS 2 Study Team.

4.18 Priority in infrastructure development will be as follows:

(i) Strengthen existing national roads (primary function) timely to meet demands and needs of areas (rehabilitation, widening, bypass, grade separation) for smooth and safe traffic;

(ii) Promote development of expressways based on the following criteria:

- To accommodate future traffic demand;

- To segregate long distance – inter-city traffic (trucks and buses) from local traffic; and
- To tap private sector capacity (financial, technical, operation and management).

(iii) Strengthen road maintenance system by ensuring provision of necessary fund, technologies and organizations

4.19 To drive these strategies, there must also be a fundamental change in the way a road investment program is formulated. A 5-year rolling program for the roads subs-sector should be a mandatory addendum to the 5-year SEDP of Vietnam. This program should stipulate the estimated budget envelope, and projects cost estimates should be prepared on the basis of engineering studies to provide confidence they are in the right order of magnitude.

3) Some Institutional and Legislative Issues

4.20 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. Furthermore, 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.

4.21 Although integration of expressway planning into national highway network has been attempted in existing strategy or plan, such as road transport master plan up to 2020 and direction up to 2030, there is still a need to enhance such effort to raise development efficiency. GRA is supposed to be responsible for the integrated planning of the national roads 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.

4.22 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.

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

4.24 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 roads and tertiary at lower levels with proportionately greater coverage. The road network should be planned by the GRA, including the identification of higher class of roads classified as expressways. Thereby the 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 it.

4.25 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.

4.26 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 channeled to VEC

4.4 Rail Subsector

1) Key Issues

4.27 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 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 groups 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.

4.28 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.

4.29 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.

4.30 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.

4.31 In the second group (railways/metros), there are two main thrusts of development. On the one hand, 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.

4.32 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 ten-year period.

4.33 To carve out a more significant future role in freight transportation, the 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) High-speed Rail

4.34 The HSR project meets an important political objective in linking the main centers of population in the north and the south of Vietnam. It has been the subject of preliminary planning in VITRANSS 2 and pre-feasibility studies in TRICC. The key findings are as follows:

(i) The 1570-km route could be traveled in 5.7–6.8hrs, much faster than existing rail (a minimum 29hrs) but much slower than air;

(ii) Its initial cost would be about USD56 billion, with the likelihood of further substantial cost escalation. This makes it a huge "megaproject." By comparison, the estimated budget envelope for all transportation sectors is estimated at USD65 billion for the decade 2009-2030 assuming continuing medium level GDP growth and the investment with 5% share of GDP for transportation sector;

(iii) Its ridership could be, depending on speed and fare, in the range of 100–250K passengers a day;

(iv) Revenues would likely cover direct operating costs, but not make a material contribution to paying the capital cost. This provides no prospect for implementation as a PSP project; and

(v) Economic viability is marginal, even assuming extensive urban land developments at intermediate stops. However, delayed investment by 10 years could improve economic viability significantly.

4.35 If built too early, the HSR project could reduce the viability of the Hanoi–HCMC express railway project. Unlike similar ventures in other countries, it is difficult that Vietnam's HSR is staged operationally in shorter sections, of say 400km, because

demand is dominated at the two ends. Moreover, megaprojects (such as the HSR and the Euro Tunnel) have a history of major overruns in implementation time and capital cost, as well as shortfalls in forecast traffic. The downside risk considerably outweighs the upside risk. A substantial risk is only worth taking if the costs would be minor in case the decision to proceed was a mistake; if it generates a lot of benefits, the decision to proceed was correct. Unfortunately, the opposite is the case for the full-scale HSR project; the cost would be prohibitive if the ridership did not materialize. The present estimate of the full-scale HSR project cost is beyond any donor, ODA or commercial bank's credit limit.

4.36 As urban centers are main generating sources of HSR, growth of medium-sized cities located along the corridor is a determinant factor for socio-economic viability of the project. As positive impacts of the HSR on environment, energy and traffic safety are also notable; timing and step-wise development strategy are the main concerns. (Chapter 5 provides a more detailed discussion on the NSHSR).

3) Strategic Priorities

4.37 The VNRA and VNR should move rapidly into their separate but complementary roles. This would remove the present uncertainties in many of the organizational plans and activities. It is a necessary condition to improve project implementation, as well as to improve rail transportation service. Without the full implementation of the restructuring program, private sector participation would most likely not come in.

4.38 Instead of trying to cater for all sectors, the railway should target specific market niches in which it has the best competitive advantage. These opportunities should be reviewed line by line. For example, on the Hanoi–Hai Phong rail line, the railways will lose freight traffic to trucking, and will lose passenger traffic to buses, especially when the parallel Expressway is built. VNR's updated market development plans could then form the basis for VNRA's track infrastructure improvement program.

4.39 Improvement of existing railways can be based on the following steps:

(a) **Function Improvement Step:** This includes: (i) maximizing the use of existing single track (50 trains/ both directions/ day), (ii) introducing safety train control facilities, and (iii) mechanizing level crossing system and fencing. This require substantial improvement in Hai Van Pass section which constraints up to 34 trains/ both directions/ day.

(b) **System Reinforcement Step:** This includes developing partial or full double track for high-demand sections in coordination with provincial development strategies.

(c) **System Modernization Step:** This includes the completion of double tracking with modern equipment and services.

These items were identified in the light of Decision No. 1686/QD-TTg (Nov, 20, 2008) and Decision No.35/2009/QD-TTg (Mar. 3, 2009) as much as possible.

4.40 The 'rail' sector actually comprises several distinct markets:

(i) The line linking Kunming with Hai Phong port: This is primarily an export line for Chinese commodities/ manufactures. ADB is investing in an expressway in the corridor.

(ii) The Nanning to Hanoi line: This is primarily an import-export line for the Hanoi

conurbation, importing inputs and exporting finished articles.

(iii) The 'suburban portions of the Hanoi and HCM line within about 50kms of the cities. These could be developed for suburban services if the capacity can be provided.

(iv) The Hanoi–HCM 1700+ km mainline. This carries passengers and freight. The fastest travel time is 29 hours and the passenger service is currently 32 trains per day (tpd 2-way). Service is constrained by: track capacity – notably at Hai Van Pass, and natural disasters that wash out the line for days at a time. Passenger demand is buoyant (trains run with 90% occupancy). They are attractive in part because of safety problems on the buses and the comfort of trains for long distance trips.

4.41 Additional areas for further considerations include following;

(i) Sai Gon–Can Tho (Mekong River Delta) corridor which is one of the most heavily trafficked corridor[3]

(ii) Sai Gon–Dong Nai–Vung Tau corridor which is also expected to accommodate large traffic volume including those generating from Thai Vai/ Cai Mep port group.

4.42 Integration of existing railways and future NSHSR is an important aspect that must be considered in improvement/upgrading of the existing railways to ensure effective connectivity between the two systems, which have their own distinct function. While NSHSR provides high-speed passenger transportation services, existing lines serve both passenger and freight. When NSHSR is implemented, the existing lines are expected to serve local passenger transportation and freight transportation demand for the north-south corridor. Integration of the two systems is important by ensuring connectivity between them at and between the stations.

4.43 The existing railway in Vietnam forms a section of Singapore–Kunming Railway Line (SKRL) for which Vietnam has committed to under ASEAN Framework Plan

4) Urban Railways

4.44 The urban rail transit projects currently underway in HCMC and Hanoi require huge investments, although not of the same order of magnitude as HSR. In case of any shortfall in forecast rail traffic, the Metros could still help to reduce the congestion on the urban road networks. They also take account of increasing concerns over climate change and oil depletion.

5) Some Institutional Issues

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

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

[3] According to traffic demand analysis when expressway is opened, the corridor can accommodate future traffic demand.

4.47 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 inter-city passenger traffic.

4.5 Maritime Subsector

1) Key Issues

4.48 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 MOT and is the traditional sector bureaucracy.

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

4.49 The maritime sector 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 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.

4.50 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

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

4.51 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.

4.52 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 IMO standards.

2) Strategic Priorities

4.53 In view of the long gestation period for the new deep-sea ports, the sector has little choice but to maximize productivity and throughput at existing ports. Additional berths and capacity can be constructed at Dinh Vu Port in Hai Phong where four of its planned seven berths are completed. Cai Lan and Cai Mep Ports have yet to reach their capacities and have room for expansion. Operational and systems improvements would require minimal investment. The use of ICT at these ports should be intensified, since this would also address a weak link in the logistics chain.

4.54 The Institution of a proper port hierarchy would examine possibilities for the complementary roles of some domestic ports. This would force a more rigorous selection of port expansion plans, to minimize overlapping port hinterlands. The upgrading of ports from lower to higher classes in the hierarchy should be driven by shipping company plans. As the current global economic slowdown favors regional over trans-continental trades, Vietnam should be extra cautious with respect to megaprojects such as the Van Phong transshipment port.

4.55 In 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 of the industry.

4.56 The human resource side of the maritime and shipping industry deserves much higher priority than the provision of more berths and larger vessels. The skills of crewmen, officers, and management are below international standards. This problem would become more acute with fleet expansion, and as the industry becomes larger, and as international shipping recruits more Vietnamese seamen. The Government has already launched training programs, and with foreign assistance is increasing the capacity of VIMARU and MTTS.

4.57 Subsector strategies for maritime sector are summarized in Table 4.4.

3) Some Institutional Issues

4.58 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 over-stretched. Further large investments in ports can only serve to reduce the resources available for the development of international and domestic shipping.

4.59 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 the single national port authority, and port regulator, without any participation in port operations or the management of the business aspects of ports.

Table 4.4 Subsector Strategies: Ports and Shipping

Goal	Specific Action
1. Enhance productivity of existing ports through various means	• Open up operations in the north and central to multiple operators • Extend the scope of port operators to provision of other logistics services
2. Develop gateway ports in association with capable access channels and feeder transportation network	• Focus investments on completion of deep-sea ports (Lach Huyen and Cai Mep) that can enhance regional trade • Enhance complementation of various ports as a system of feeders and hubs to avoid overlapping hinterlands • Ensure connectivity with road, rail and IWT as well as industrial zones in the hinterland • Develop and maintain main channels to ensure safe and smooth navigation of large vessels
3. Liberalize domestic shipping and modernize fleet	• Promote private sector innovation in coastal shipping, especially in container shipping • Adopt a ship-leasing program to upgrade/renew maritime fleet • Introduce RoRo and passenger services as cheaper alternative to land-based transportation
4. Comply with IMO standards on vessels and crews	• Intensify training of crews combined with international standards certification • Enhance vessel inspections and certification process

Source: VITRNASS2 Study Team

4.60 At 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.

4.61 The system for integration of plans, the development and the management of the port facilities and the surrounding water and land area, administrative systems needs to be established.

4.6 Inland Water Subsector

1) Key Issues

4.62 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 still has retained some advantages for bulk transportation.

4.63 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.

4.64 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. The inland waterway systems differ. 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.

4.65 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 Tri–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 nighttime operations) can yield significant benefits.

4.66 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 (e.g., Cho Gao Bridge and Binh Loi Railway Bridge) in some cases.

4.67 The major seaports of Vietnam are physically located on rivers. This gives rise to some ambiguity as to where IWT operations end and coastal shipping operations start. This ambiguity has led to uncertainty over the jurisdiction for current usage and maintenance of river ports and channels. 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?

2) IWT Subsector Strategy

4.68 A sustainable scale of IWT network needs to be established for each of the three main IWT regions. This means small enough to be affordable, but large enough to ensure the viability of the strategic industries that are dependent upon the inland waterways. The size of the regional IWT network is likely to be largest in the Mekong delta and smallest in

the central region. In total, it is likely to be smaller than the 6,000km of inland waterways currently being managed by VIWA. The selection of reduced IWT network should be driven primarily by traffic demand and the characteristics of the waterway system within each respective region. In order not to dissipate resources – financial and human – the regional waterway authorities should focus on the planning and maintaining the waterways themselves. In future inland port operations, barging, and ferry services should be provided by Provinces and/or the private sector.

4.69 The funding for IWT maintenance should be stabilized through creating a waterway maintenance fund in addition to annual budgetary support. Some complementary steps will assist, such as: (i) involve the main industrial users of waterways in their management, (ii) charge riverfront frontage fees, and (iii) charge other fees on river vessels, according to their size and weight.

4.70 Subsector strategies for inland water transportation are summarized in Table 4.5.

Table 4.5 Subsector Strategies: Inland Water Transportation

Goal	Specific Action
1. Ensure sustainable scale of IWT operations	• Define minimum size of river network in RRD and MD the navigability of which must be protected and enhanced • Focus government investment funds on river channel improvements, dredging, and facilities for safe navigation and leave other aspects to private sector/province
2. Stabilize funding support for channel maintenance	• Institutionalize participation of industries that are reliant on waterways • Impose river frontage charges/fees to be earmarked for maintenance
3. Create a new market for IWT - particularly as an alternative for non-bulk freight and passenger traffic	• Promote riverbanks for 'green' re-development into mixed-use, industrial, commercial and residential complexes
4. Continuously improve traffic safety on riverways	• Identify and remedy black spots along rivers • Modernize barge fleet • Promote safety training and licensing of vessel pilots

Source: VITRNASS 2 Study Team.

3) Classification Standards

4.71 Vietnam has adopted a standard classification of waterways, from Class 1 (which is the highest) to Class 6 (the lowest) differentiated by depth, width, and radius of curvature. This system sets the minimum standards for which a river or canal has to be maintained. Most improvement projects will then be a case of either retaining the same class or moving up from one class to the next. However, VIWA receives few public funds and is limited in what it can do.

4) System of Ports

4.72 Inland ports and seaports should be viewed holistically as parts of a network system of ports. If a hub and spoke system is introduced, interchange problems can be identified and remedied. Barge-to-ship transfer, and vice versa, is inefficient and should be avoided.

5) Some Institutional Issues

4.73 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. Where does one agency's area of responsibility (jurisdiction) start and the other's end? The major seaports of Vietnam are physically located on rivers. Thus there is some ambiguity as to where IWT ends and coastal shipping starts. 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.

4.7 Aviation Subsector

1) Key Issues

4.74 If based solely up market share of passenger and freight in the total transportation market, the aviation sector 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.

4.75 There are no major issues facing the sector. Government is moving in the right direction and has already adopted major policies that would position the sector for a better future. It has separated the regulatory function from the operator role. Competition in domestic scheduled services has emerged, coupled with 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.

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

2) The Locations where Airport Capacity Increases are required

4.77 It is necessary for each FEZ to be served by an international airport. Asia is expected to become the dominant economic area within the next twenty years, and with it will come a greater reliance on air transportation for business and tourism.

4.78 There is no immediate capacity problem - either at Noi Bai, at Tan Son Nhat, or at Danang. A new international passenger terminal for TSN has been completed. Passenger terminal for Noi Bai has also undergone renovation. A new passenger terminal building for Danang should be completed in 2011. The runways for each of these three airports are adequate, with available land areas for future expansion, as needed. However, the surge in air traffic over the last five years has attracted proposals for additional airports.

4.79 Where extra airport capacity should be provided? In the north, Noi Bai will need a new passenger terminal building (T2); its current terminal building T1 has already exceeded capacity. In the south, the Tan Son Nhat airport justifies construction of a new cargo terminal building. Apart from the two schemes, additional airport capacities are of questionable urgency, given the present global decline in air travel.

4.80 However, the estimate of VITRANSS 2 indicates that Tan Son Nhat airport can only be expanded up to the capacity of 20 million passengers[4], which however will be reached by

[4] Further expansion of Tan Son Nhat airport is difficult due to its proximity to the heavily developed urban area.

2016–2018. It is advisable that development of a new international airport in Long Thanh must be considered as this kind of mega project always requires lengthy time before completion. What to do with the Tan Son Nhat airport after the opening of Long Thanh airport needs close look from both air transportation and urban development aspects.[5]

4.81 Danang airport must be given more attention. In order to accelerate growth of the CFEZ, similar development strategy, which was successfully undertaken in NFEZ and SFEZ, cannot be adopted because of limited market and poor infrastructure for FDI based industrial development. Instead, rich potential of cultural and natural environment including three World Heritage sites, beautiful long beaches, fauna and flora must be fully taped by promoting tourism and green business. For this recommended strategy is to much strengthen Danang airport and open direct international air services between main cities in Asia and the world.

4.82 Although it is understandable that each Province would want a major airport, the number of International airports in Vietnam should be determined solely by traffic demand; i.e., they should only be provided where significant international traffic can be clearly justified commercially. Such airports require customs/immigration controls, and it is in Vietnam's interest to keep them at high standards, in part for security reasons.

4.83 Considering Vietnam's geographic characteristics of long stretched land and wide spread mountainous areas which constraints smooth access by land. As urbanization makes progress, cities will grow and interprovincial travel demand for high quality services will increase. At the same time, traffic demand between these cities and those in neighboring countries will also increase for the purpose of tourism and other socio-economic activities. Although it is difficult to estimate these demand correctly, it is to be considered that aviation sector must respond to these secondary international and domestic needs.

3) Standards and Airport Classification

4.84 A temporary slowdown in demand 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. The airport accessibility needs of disabled persons should also be stipulated, as this seems to have been overlooked. There is an airport hierarchy: 3 major international airports [gateway] – Hanoi, Da Nang and HCM; 4 'secondary airports [Can Ranh, Hue, Hai Phong, and Can Tho]. VITRANSS 2 recommends that the category 'others' be subdivided into 'tertiary – with regular services and 'other'.

4.85 The issue of obstacles to airport zones of operations has recently been addressed under Decree 20/2009/ND-CP "Control of Aviation Obstacles" (approved 23 February 2009). Under the decree, responsibility for controlling aviation obstacle is assigned to the Ministry of Defense. This may have to be supported with corresponding airport zoning maps to delineate obstacle-free area for all civil airports.

4) Airline Services

[5] Experiences of other airports in the region can provide some lessons. Hong Kong and Kuala Lumpur shut down old ones, while Shanghai, Seoul, Tokyo, and Osaka split the services for both old and new airports.

4.86 Vietnam has begun to introduce competition in the domestic air transportation market. 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 so-called 'missionary' routes. If an airline is obligated to provide scheduled services to domestic destinations not economically viable under regulated fare levels, then the government should bid out the service provision under a least-cost subsidy scheme. Vietnam Airlines cross-subsidizes domestic services from international, and services to remote areas from other domestic services. Staff has a public service (not private sector) culture. As private service operators penetrate the market change is expected.

5) Some Institutional Issues

4.87 The recent restructuring of air transportation institutions – Civil Aviation Administration for the overall regulation of aviation, and 3 regional Airport Corporations for airport development and operation - is well on course.

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

4.89 While the three regional airport corporations are free to expand capacities and/or build new airports, the CAAV should ensure that overlapping hinterlands are minimized and that the requirements of safe air traffic navigations are fully met.

4.8 Urban Transportation Subsector

1) Key Issues

4.90 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 of urban population within secondary cities – particularly in the medium-sized cities –will be a major challenge.

4.91 HCMC and Hanoi have started to construct rail-based mass transit systems. The first lines are some years away from opening, but already commitments are being made 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, 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 for cost recovery and improvement of urban environment.

4.92 Even after the development of urban rail network, bus must meet the largest portion of public transportation demand. While both HCMC and Hanoi made initial success in bus operation, they need further improvement of quality of services and expansion of the system including replacement of old buses, upgrading bus facilities, improvement of operational management system. Upgrading of bus system 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 own revenue of local governments. This is a potential threat to promote development of compact urban area.

4.93 Another challenge for the key cities in Vietnam will be to manage the transition from motorcycle usage to public transportation usage, and to control ownership and usage of private cars. Particularly sharp increase in private cars and automobiles is becoming a main cause of traffic congestions in big cities. As urban rail and bus transportation services are improved, control measures against private vehicles must be seriously considered through pricing and parking policy.

2) Integrated Development to Promote Public Transportation Based Urban Areas

4.94 Evidently, it is not possible or justifiable to execute all the urban rail proposals – whether emanating from the VNR or from the Cities. It is logical for the interprovincial lines to bypass the congested cores of the cities (HCMC, Hanoi, Hai Phong) – either by elevating the existing tracks or relocating their alignments. Completing on-going UMRT Lines of HCMC and Hanoi deserve the highest priority within the urban transportation subsector. Once they are operational and the city has observed their effectiveness, then the next lines can be considered.

4.95 Two aspects need to be planned in time with the introduction of UMRT. Firstly, the integration of urban development in and around rail stations to increase transit ridership, coupled with control over urban sprawl needs to be planned. Secondly, a fund needs to be established to cover annual subsidies that mass transit and BRT systems might require.

4.96 For secondary or medium-sized cities, expansion of urban areas due to increase in urban population must be integrated with transportation infrastructure in a way that development of public transportation based-urban areas can be promoted.

3) Some Institutional Issues

4.97 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 MOT, MPI, and MOC.

4.98 There is 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.

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

4.9 Multimodal Transportation Subsector

1) Key Issues

4.100 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.

4.101 The reason is mainly institutional. The transportation system is organized by transportation mode, and no single mode is focused on creating 'multimodal chains' and 'seamless transfers at nodes' that are needed to lower transportation costs. Modal administrations have been used to defining rather narrowly-focused plans.

4.102 Inadequate infrastructure has always been cited as the reason for the high logistics costs of Vietnam, estimated by some at 25% of 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

4.103 The MOT should assume the role of multimodal planner, and require each sub focused agency to submit projects that have been properly evaluated. Concurrently, MOT can examine the 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

4.104 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 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 despite recent initiatives of the government.

4.105 Nurturing the growth of third-party logistics providers (3PLs) is also imperative to improve Vietnam's trade competitiveness. Such enterprises are accustomed to the just-in-time inventory practices of global trade. To bypass domestic hold-ups, multinationals often bring in their own 3PLs to ensure that their products get to market on time, and that raw materials arrive just in time. Which policy measures will support 3PLs in Vietnam? These will include the liberalization of entry rules for foreign logistic companies, a revision of the licensing rules hindering multi-service logistics businesses, and an intensification of training in modern logistics as well as upgrading of staff competence.

Table 4.6 Subsector Strategies: Logistics

Goal	Specific Action
1. Reduce overall logistics cost of Vietnam	• Implement interventions on bottlenecks of supply chain, e.g., port productivity, warehousing and transfer points • Ensure multimodal planning for faster development of least-cost transportation modes for freight • Identify opportunities for improvements for specific export products
2. Nurture growth of 3rd Party Logistics Providers (3PLs)	• Review regulations impeding growth of multi-service logistics enterprises • Liberalize entry of foreign logistics players • Develop human resources to upgrade competence and professionalism in the subsector
3. Intensify and integrate ICT in logistics processes, especially at customs and borders	• Strengthen logistics industry organization • Promote standardization in operations, such as documentation, technology standards, etc. • Develop logistics portals to link all players across the supply chain

Source: VITRNASS 2 Study Team.

5 NORTH–SOUTH CORRIDOR DEVELOPMENT

5.1 Significance of the North–South Corridor

5.1 Among the corridors identified in VITRANSS2, the north-south coastal corridor is the most important politically for Vietnam, since it serves to integrate the three focal economic zones. Planning for the improvements in this corridor also illustrate the required efforts for establishment of a multi-modal framework, environmental assessment and mitigation, and the funding constraints identified in VITRANSS 2.

5.2 Future traffic demand along the north-south coastal corridor is expected to be significant both for passenger and freight traffic (see figures 5.1 and 5.2). For example, cross-section passenger traffic along the corridor will increase by 4 to 5 times by 2030, while that of freight traffic will also increase by 3 to 4 times for the same period. Under the "Do-nothing Scenario," large demand of passenger traffic request for travel by air which will be more and more preferred for long distance as people's income increases. Shift to passenger cars is also notable for medium distance of travel. Increase in freight traffic demand require three modes of transportation; namely road by truck, rail and coastal shipping. This implies the following:

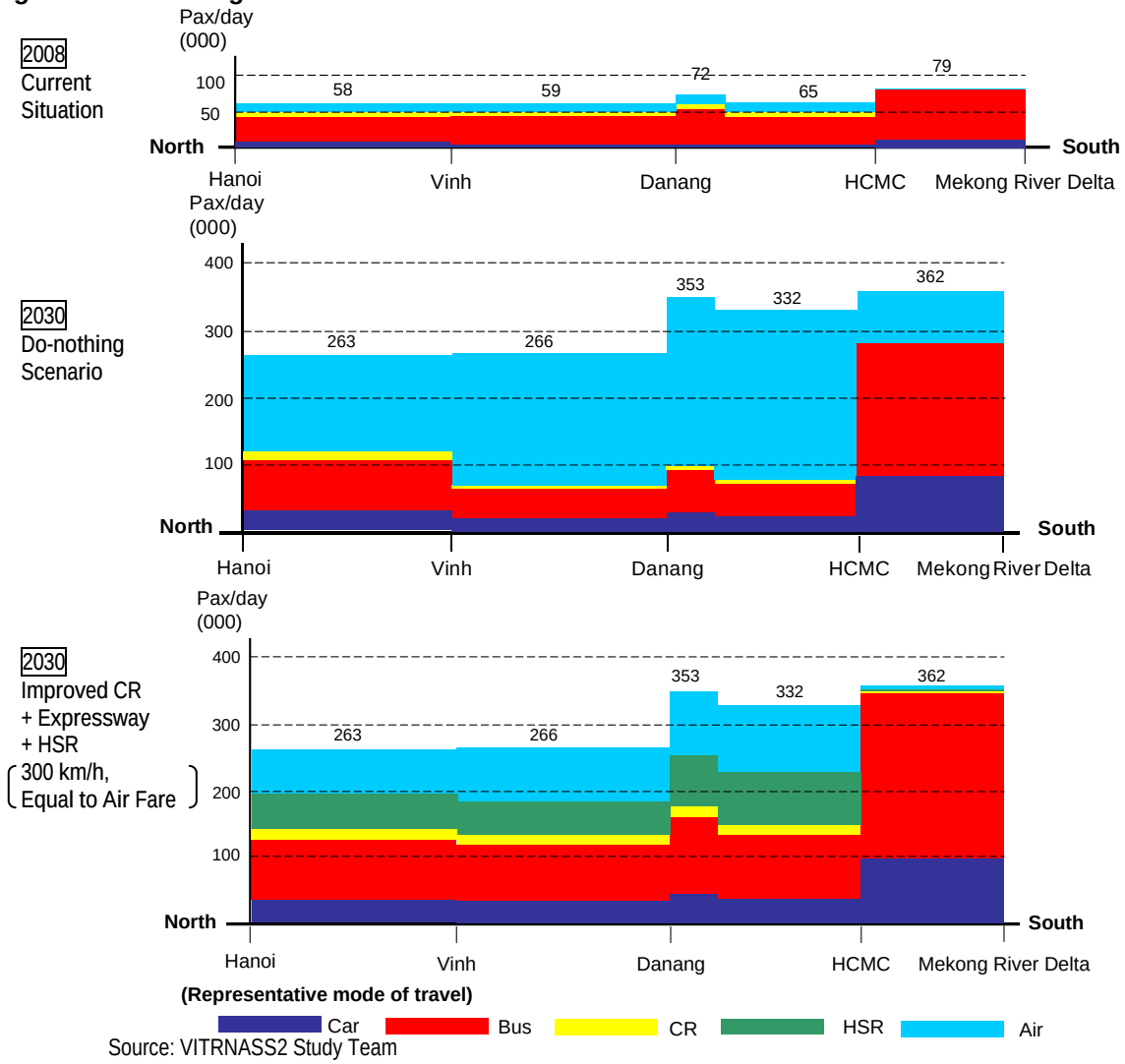
(i) How best to meet long-distance travel of passengers along the corridor which can hardly be met by air transportation alone. There is a need to provide high-speed services with affordable fare. Demand analysis suggests that there is opportunity to develop expressways and high-speed train services as is seen in the last graph in Figure 5.1. With expressways, high-speed railway and air services, balanced modal share along the corridor is observed.

(ii) With regard to freight, a sharp increase in truck traffic is estimated when expressways are developed (see Figure 5.2). In order to relieve expected congestions and mitigate the negative social and environmental impacts from using heavy vehicles, a shift to coastal shipping and railway seems necessary.

5.3 The significance of the North–South Coastal Corridor will become more and more important economically and socially in the future. The competitive coastal corridor also provides cities and growth centers located along the coast with opportunities for strong socio-economic integration and balanced development.

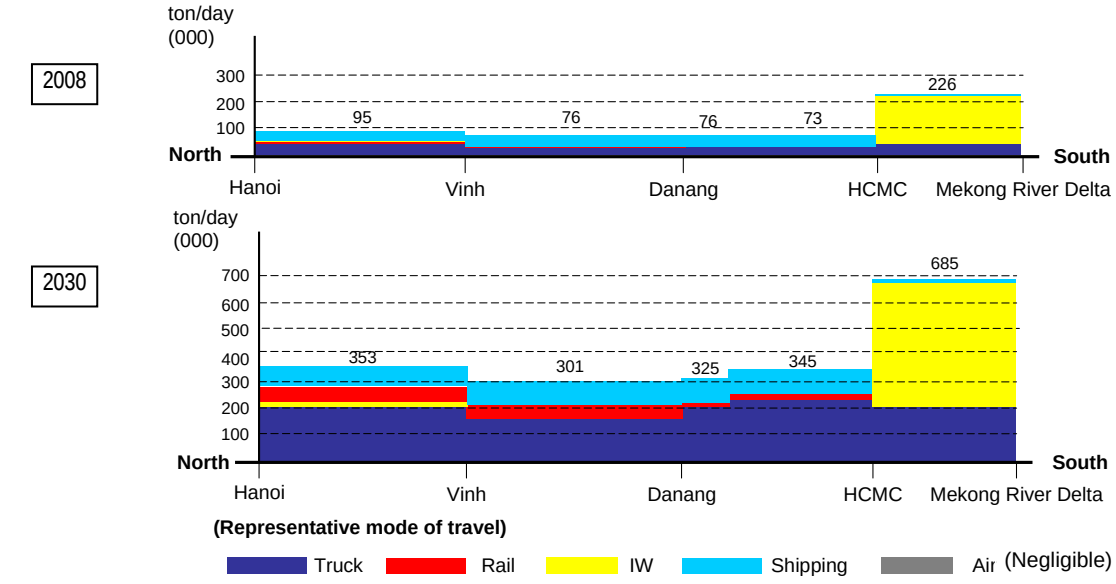
5.4 Along with the coastal corridor, the North–South Upland Corridor (Ho Chi Minh Highway) links upland provinces and the coastal corridor with a number of east-west corridors in a ladder form. The North–South Upland Corridor also functions as alternative route of the coastal corridor. The parallel two north-south corridors and international and domestic east-west corridors form the backbone for integrated national land development linking all major growth centres of the country

Figure 5.1 Passenger Traffic Demand and Modal Share on the North–South Coastal Corridor



Source: VITRNASS2 Study Team

Figure 5.2 Freight Traffic Demand and Modal Share on the North–South Coastal Corridor



Source: VITRNASS2 Study Team

5.2 North–South High-speed Railway (NSHSR)

1) Approach

5.5 The study on the NSHSR is mainly composed of engineering study and economic/financial study. Although the study has been conducted both by VITRANSS 2 Team and the TRICC Team in close coordination, a main contribution of VITRANSS 2 is the analysis of the development scenarios and the formulation of strategies which provided the basis for discussion with the Steering Committee members and other stakeholders.

5.6 As the project requires a huge amount of public fund, a focus was to assess economic and financial viability of the project and find a realistic way to more the project forward. Tested scenario in the study includes following:

(i) Analysis of full section (Hanoi–HCMC) development scenario;

(ii) Analysis of conditions and factors which make “Full-development Scenario” feasible;

(iii) Analysis of “Partial-development Scenario” including (a) Hanoi–Vinh Section and (b) HCMC–Nha Trang Section; and

(iv) Concept of Danang–Hue Section development.

2) Conditions and Assumptions for Base Case Analysis

5.7 The base case scenario assumes following:

(i) Profile of the system
- Route: Hanoi–HCMC (1,570km)
- No of Stations: 26
- Operating Speed: 300km/hour
- No. of passengers/train: 81/car × 10-12 cars = 810-972
- Investment costs: US$ 38,024 million excluding rolling stock, contingency and taxes

(ii) Opening year: 2026

(iii) Fare of HSR: 100%, 75%, 50% and 25% of air fare

(iv) Profile of other competing modes
- Main expressway network is in place (4,400km)
- Existing railway is improved with 100km/h speed and double track

(v) Access/egress time (minutes): HSR(60), VNR(30), Air (180)

(vi) Benefits included
- Vehicle operating costs saving
- Travel time costs saving
- Reduction in road traffic accidents

(vii) Benchmark Indications for Feasibility
- EIRR (Economic Rate of Return): 12%
- FIRR (Financial Internal Rate of Return): 15%
- Fare box ratio: higher than 1.0

3) Evaluation Results of "Full-development Scenario"

5.8 The results of the analysis shown in Table 5.1 are briefly as follows:

(i) Ridership varies depending on the fare level between 146,000 and 248,000 passenger/day.

(ii) EIRR is low in all cases. In the case of 50% of air fare, it is 6.9%. However, if the fare is low (25% of the air fare), EIRR becomes 9.6%

(iii) FIRR cannot be calculated indicating investment cost cannot be recovered. However, operating costs can be covered by fare revenues if the HSR fare is higher than 50% of air fare.

(iv) Benefits are composed of vehicle operating cost saving (57%), travel time cost saving (17%) and reduction in traffic accidents (26%).

Table 5.1 Economic and Financial Indicator of HSR Project (Full-development Scenario)

Speed (km/h)	Fare	No of HSR Passengers 2030 (000/day)	Economic Indicator		Financial Indicator	
			EIRR(%)	B/C Ratio	FIRR(%)	Fare Box Ratio
300	Same as Air	146	-	0.46	-	1.9
300	3/4 of Air	172	5.6	0.58	-	1.5
300	Half of Air	208	6.9	0.66	-	1.1
300	Quarter of Air (equal to bus/CR)	248	9.6	0.84	-	0.6

Source: VITRNASS 2 Study Team.

4) Analysis of Conditions to Make "Full-development Scenario" Feasible

5.9 While the base case scenario is economically unfeasible, an exercise was made to find conditions to make the scenario feasible. The results are as follows:

(i) Accelerated urban development along the north-south corridor: As cities and urban areas are main source of HSR passengers it is assumed that urban population of main cities will further increase.[6] Then EIRR will increase from 6.9% to 9.3%

(ii) Postponement of opening year by 10 years and 20 years:

- Opening of HSR in 2036: EIR is 11.6%
- Opening of HSR in 2046: EIRR is 16.3 %

(iii) Increase in fuel cost by 50% for road and air: EIRR will increase to 8.1%

(iv) Accelerated urban development + postponement of opening to 2036: EIRR is 14.1 %.

5.10 Results of financial analysis do not change much. FIRR cannot be calculated but fare box ratio is more than 1.0 in most cases.

[6] Total urban population of Thanh Hoa, Vinh, Hue, Danang, Tam Ky, Quy Nhon, Nha Tran, Phan Thiet and Bien Hoa will increase from 4 million to 14 million from 2005 to 2030. MOC's estimate is 9 million by 2030.

5) Analysis of Partial-development Scenario

5.11 Partial-development scenario includes priority sections of Hanoi–Vinh and HCMC–Nha Trang sections. Their profiles are as follows:

(i) Hanoi–Vinh Section
- Route length: 282 km
- Investment costs: USD 7.2 billion excluding rolling stock

(ii) HCMC–Nha Trang Section
- Route length: 382 km
- Investment costs: USD9.2 billion excluding rolling stock.

5.12 Partial development of the priority sections of the NSHSR shows relatively higher EIRR (see Table 5.2). Both sections show higher EIRRs than full section development scenario, indicating competitiveness of HSR for the medium distance and nearness of the route to big cities.

Table 5.2 Analysis Results of Partial-development Scenario[1]

Item		Scenario		
		1. Base Case	2. Accelerated Urban Development	3. Accelerated Urban Development + 50% Increase in Fuel Cost
Ha Noi-Vinh	Ridership (000/day)	61	98	98
	EIRR	7.9 %	12.8 %	14.5 %
	FIRR	-	-	-
	Fare Box Ratio	0.9	1.0	1.0
HCM- Nha Trang section	Ridership (000/day)	101	129	129
	EIRR	9.1%	11.8%	13.8%
	FIRR	-	-	-
	Fare Box Ratio	1.0	1.1	1.1

Source: VITRANSS 2 Study Team.
[1] Opening year is assumed to be 2020 because of shorter construction period

6) Possible Measures to increase FIRR

5.13 While feasible level of EIRR can be obtained by assuming various conditions, financial viability of the NSHSR is extremely constrained due to top heavy large-scale investment. In order to examine opportunities to enhance FIRR, following conditions are taken into account:

(a) **Introduction of Business-class Seats:** About a half of the passengers will pay air fare while others pay half of air fare.

(b) **Possibility of Non-transportation Revenue:** Based on the cases of JR railway companies of Japan, it is assumed that 30% of total revenue will be sourced from non -fare revenue such as those of renting station space, managing shopping and office business, distribution business and others.

5.14 The results indicate that although positive FIRR can be obtained the maximum level is about 5% to 6% only. On the other hand Fare Box Ratio will improve significantly.

7) Concept of Danang-Hue Section Improvement

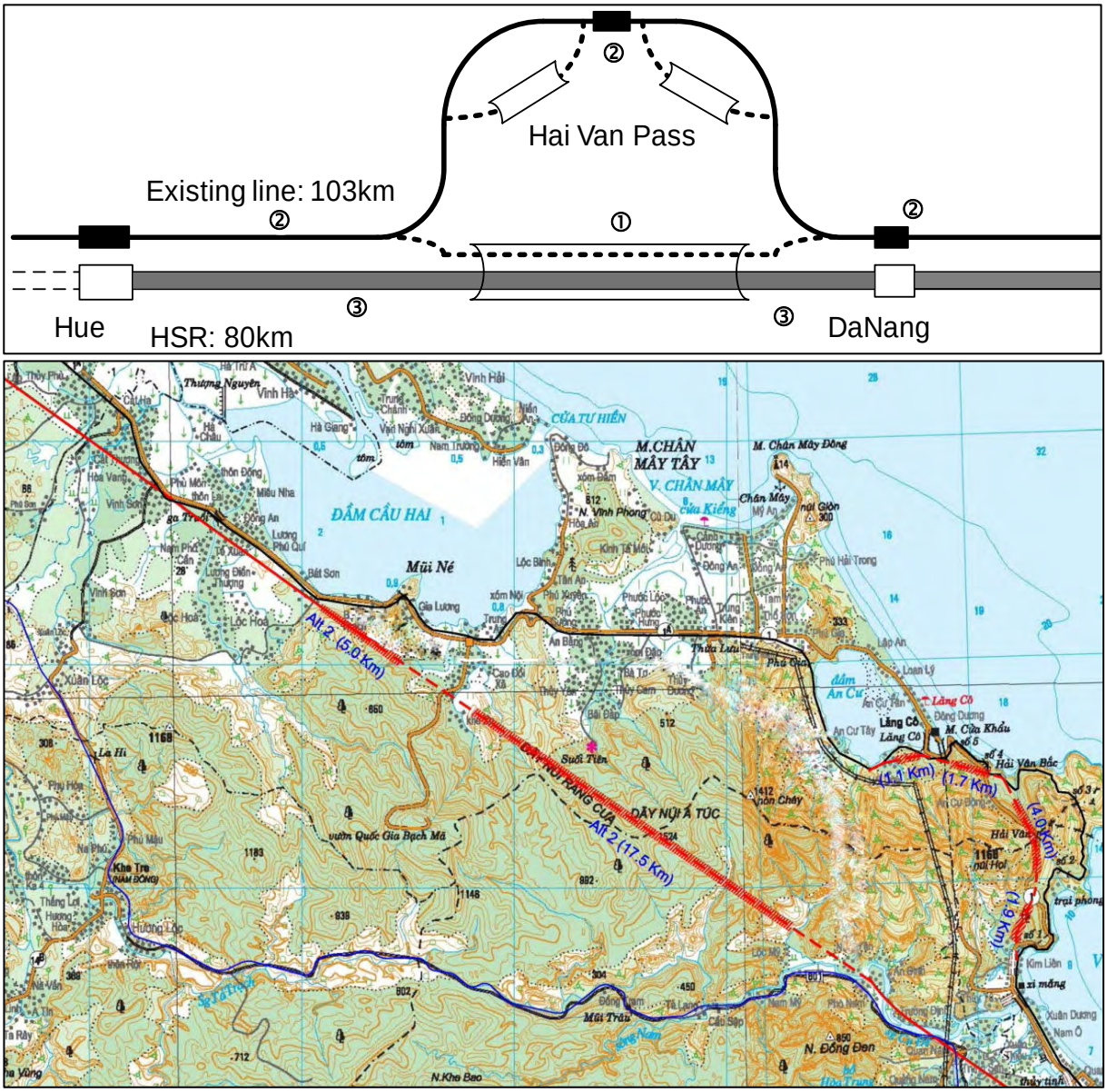
5.15 The section crossing Hai Van Pass is the most critical one in developing the NSHSR as well as for existing railway. For this a conceptual study was undertaken to focus on this section in a way that it will meet both immediate and future needs effectively. The concept is shown in Figure 5.3 and explained briefly as follows:

① **First Step:** To construct a new tunnel with full HSR standard and divert existing railway to the new tunnel to continue current operation on single track. With this current VNR operation can save time and avoid disasters.

②**Second Step:** To improve remaining Hue–Danang section of existing railway including new short tunnels in Hai Van Pass section. This tunnel development may have a wide variety of options.

③ **Third Step:** To develop NSHSR and relocate existing railway back to the improved section.

Figure 5.3 Danang–Hue Section Improvement Project



8) Required Tasks before North-South High Speed Railway Development

5.16 To realize the NSHSR, many key issues should be addressed besides the construction work. It is preferable to tackle these issues as soon as possible before the construction or the operation starts.

Table 5.3 Main Issues for North-South High Speed Railway Development

Key Aspects	Main Issues
● Land Acquisition	• Delay in land acquisition for a partial section affects the schedule for a whole line, resulting in high risks of NSHSR development. • Effective implementation approach and implementation plan for smooth implementation must be introduced.
● Human Resource Development	• Human resource development programs should be designed to train necessary staff in proper ways. • It should consider the current human resource situation and concrete study methodologies.
● Design of Development and Operational Institutions	• Institutional reform plan which provides clear institutional responsibilities and jurisdictions setup to develop and operate HSR in harmony with existing railways shall be necessary.
● Development of Regulations including Technical Standards	• Efficient and smooth railway development and operation require development of regulations stipulating the roles of local authorities, private sector and other stakeholders, development procedures, engineering standards as well as land acquisition process and development and operational institutions
● Integrated High Speed Railway and Urban Development Plan	• Integrated development plan of NSHSR and urban area will enforce the importance of NSHSR as transport system connecting urban areas and growing centers strongly and accelerating the well-balanced national land development. • Integrated urban development also ensures the feasibility of NSHSR.
● Implementation Plan	• Implementations of NSHSR face varieties of issues (funding, land acquisition, connectivity with urban transport in Hanoi and HCMC, development measures in sections where require high level engineering approaches, e.g. Hai Van Tunnel, disaster prevention, environmental impacts and others.) • Feasible sections should be chosen based on a detailed feasibility study. Sections must be developed with a phased approach.

Source: VITRANSS 2 Study Team.

5.17 The required tasks were identified as shown in the following table. Conducting these tasks carefully and substantially, the construction would be implemented smoothly and the operation would start in efficient and effective manner without any big troubles

Table 5.4 Required Tasks before North-South High Speed Railway Development

Tasks	Actions
1. Land Acquisition	(a) Adopt HSR to Urban Development Plan (b) Establish implementation system for local central government (c) Develop regulations regarding land acquisition (d) Acquire land for test truck (e) Acquire land for priority sections
2. Human Resource Development	(a) Develop human resource development plan (b) Develop human resource development system (c) Implement training
3. Design of Development and Operational Institutions	(a) Develop HSR operational institution Plan (b) Develop relevant regulations (c) Develop operational institutions
4. Development of Regulations including Technical Standards	(a) Develop regulations and implementation standards regarding HSR technical standards (b) Develop regulations regarding HSR construction and operations
5. Integrated High Speed Railway and Urban Development Plan	(a) Revise urban development plans and local development plans (b) Implement integrated urban development projects (c) Develop HSR promoting measures (d) Implement HSR promoting measures
6. Implementation Plan	(a) Conduct F/S (b) Formulate phased development plan (c) Implement Detailed Design for each phase

Source: VITRANSS 2 Study Team.

5.3 Basic Plan for the North–South Expressway

1) Role of North–South Expressway in Overall Transportation System

5.18 The need for high-quality transportation infrastructure to provide much more improved services, especially along the national backbone, has long been a priority policy in the national land and transportation development plan of Vietnam. One such plan is the development of the North–South Expressway together with the development of a high-speed railway, air transportation, and coastal shipping.

5.19 Although intensive investments in roads have been made during the last decade, the demand-supply gap has widened more than ever in and around major urban areas and along main transportation corridors. In addition to the sharp increase in overall road traffic volume, the nature of traffic also changed, such as increase in cars for passenger transportation and heavy trucks for goods transportation, although motorcycle numbers remain considerable on the roads. These changes are taking place everywhere on conventional national roads, which are mostly substandard and associated with unplanned roadside developments. Many sections of main roads have become degraded, hampering smooth inter-city traffic and decreasing safety and comfort levels for local transportation. Safety levels have also suffered due to increasing mix of different types of traffic. While these problems can be alleviated by widening main roads, this too is difficult to implement on many sections because of the need for resettlement and high investment costs, among others. Segregating long-distance heavy traffic from local traffic is also hard to implement because of the many at-grade intersections.

5.20 Because of the above, a need for expressways has been increasingly felt in Vietnam from the economic, social, and environmental viewpoints. The main roles of expressways in Vietnam are thus envisioned as follows:

(i) Segregate long-distance traffic from local traffic;

(ii) Facilitate provision of competitive transportation services ensuring efficiency, safety, and amenity;

(iii) Serve as strategic means of regional development; and

(iv) Serve as core transportation corridors integrating key transportation modes with due consideration of the following:

- Guarantee of connectivity among major cities, provincial capitals, and growth centers including major industrial zones, gateway ports and airports, all of which must be accessed by expressways within a reasonable period of time;
- Realization of effective network configuration with national and major provincial roads, as well as urban roads; and
- Provision of the desired quality of passenger and freight transportation services by strengthening intermodal facilities, logistics, and road user service facilities, as well as introducing IT applications.

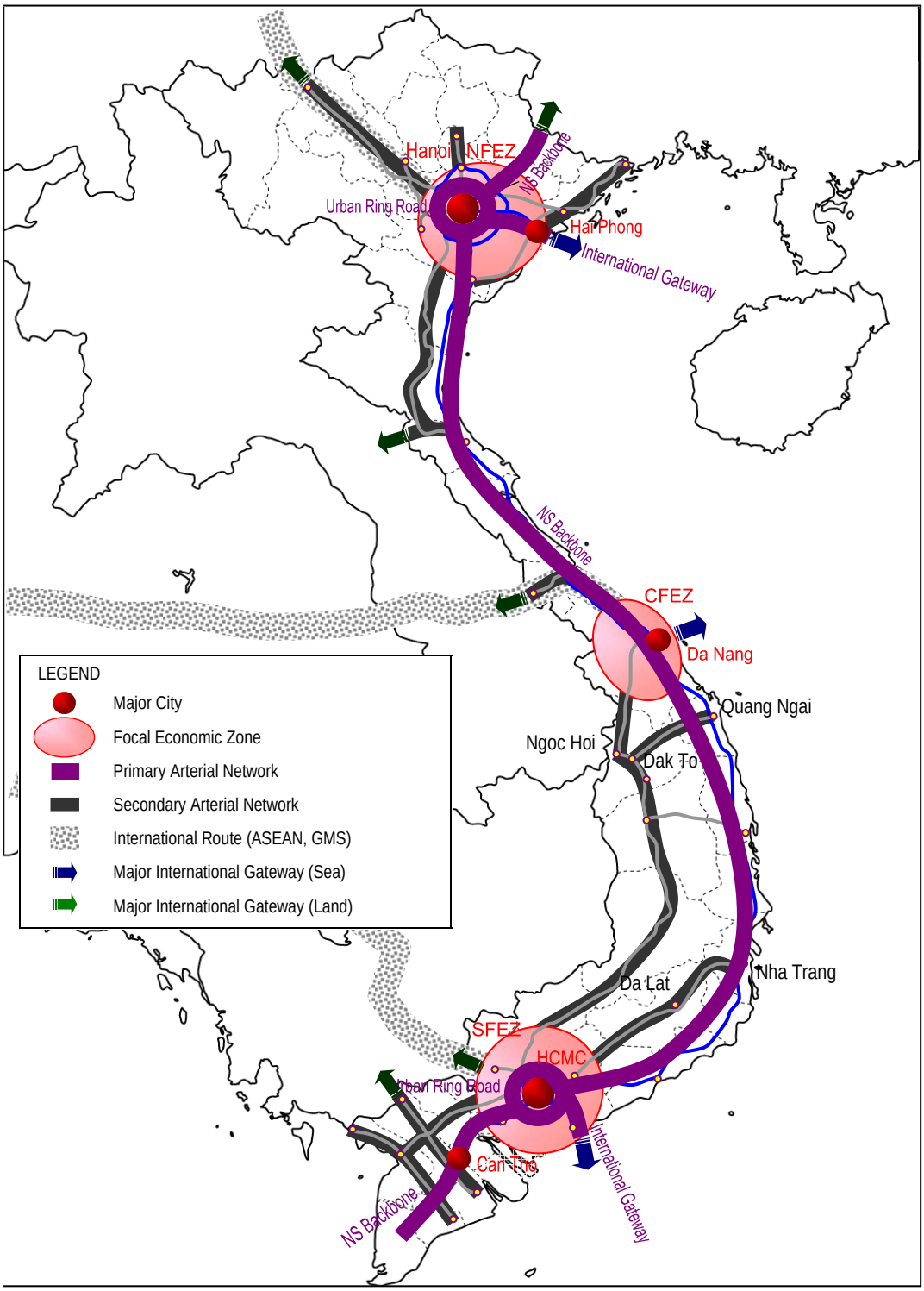
5.21 Based on the conceptual expressway network as shown in Figure 5.4 three new sections were identified for inclusion to the overall network[7]. They are as follows:

(i) Danang–Ngoc Hoi (250km) to strengthen between the central region with Danang and establish a new East-West corridor connecting Pakxe in Lao PDR;

[7] Although these sections must negotiate with difficult terrain conditions it is worth to be considered.

(ii) Quang Nai–Dak To (170km) to strengthen connectivity between Dung Quat Industrial Zone, central high lands and Lao PDR; and
(iii) Nha Trang–Da Lat (80km) to strengthen connectivity between central high land and coastal growth zone

Figure 5.4 Conceptual Expressway Network Development Plan



Source: VITRANSS 2 Study Team.

2) Profile of North–South Expressway

5.22 Many sections of the NS Expressway have been undergoing various stages of development such as construction, detailed design, FS, and so on (see Table 5.3).

Table 5.5 Current Status of NSEXY

Code[1]		Section	Length (km)	F/S・PreF/S Situation
NS-Code	VITRANSS 2			
NS01	H30	Ring Road No.4 in Ha Noi	90	F/S is ongoing (by TEDI)
NS02	CH01	Cau Gie – Ninh Binh	50	Under construction
NS03	H01	Ninh Binh – Thanh Hoa	75	F/S implementation (by VNCC) is approved by Prime Minister
NS04	H02	Thanh Hoa – Vinh	140	F/S implementation (by VNCC) is on application process
NS05	H03	Vinh – Ha Tinh	20	Pre F/S is completed (by TEDI)
NS06	H04	Ha Tinh – Quang Tri	277	No information
NS07	H05	Quang Tri – Hue	73	Cam Lo-Tuy Loan section: F/S implementation (by BT company) is on application process.
NS08	H06	Hue – Da Nang	105	
NS09	CH02	Da Nang – Quang Ngai	131	D/D is going to be implemented (by WB) Funding by WB and JICA is expected
NS10	H07	Quang Ngai – Quy Nhon	150	Pre F/S is ongoing (by TEDI)
NS11	H08	Quy Nhon – Nha Trang	240	No information
NS12	H09	Nha Trang – Phan Thiet	280	F/S is ongoing by a local consultant under MOD
NS13	CH03	Phan Thiet – Dau Giay	100	F/S is ongoing (by BITEXCO)
NS14	CH04	HCMC – Long Thanh – Dau Giay	55	D/D is ongoing (by ADB)
NS15	H33	Ring Road No.3 in HCMC	83	F/S is ongoing (by TEDI-S)
NS16	H10	Long Thanh – Nhon Trach – Ben Luc	45	F/S completed (by JETRO), F/S ongoing (by TEDI-S), PPTA Is ongoing (by ADB), D/D is going to be implemented (EOI was submitted by ADB) Funding by ADB and JICA is under consideration
NS17	CH05	HCMC- Trung Luong	40	Under construction
NS18	CH06	Trung Luong – My Thuan – Can Tho	92	F/S is completed (by VIDB) (Trung Luong – My Thuan: BOT by VIDB is expected) (My Thuan – Can Tho: ODA is expected)

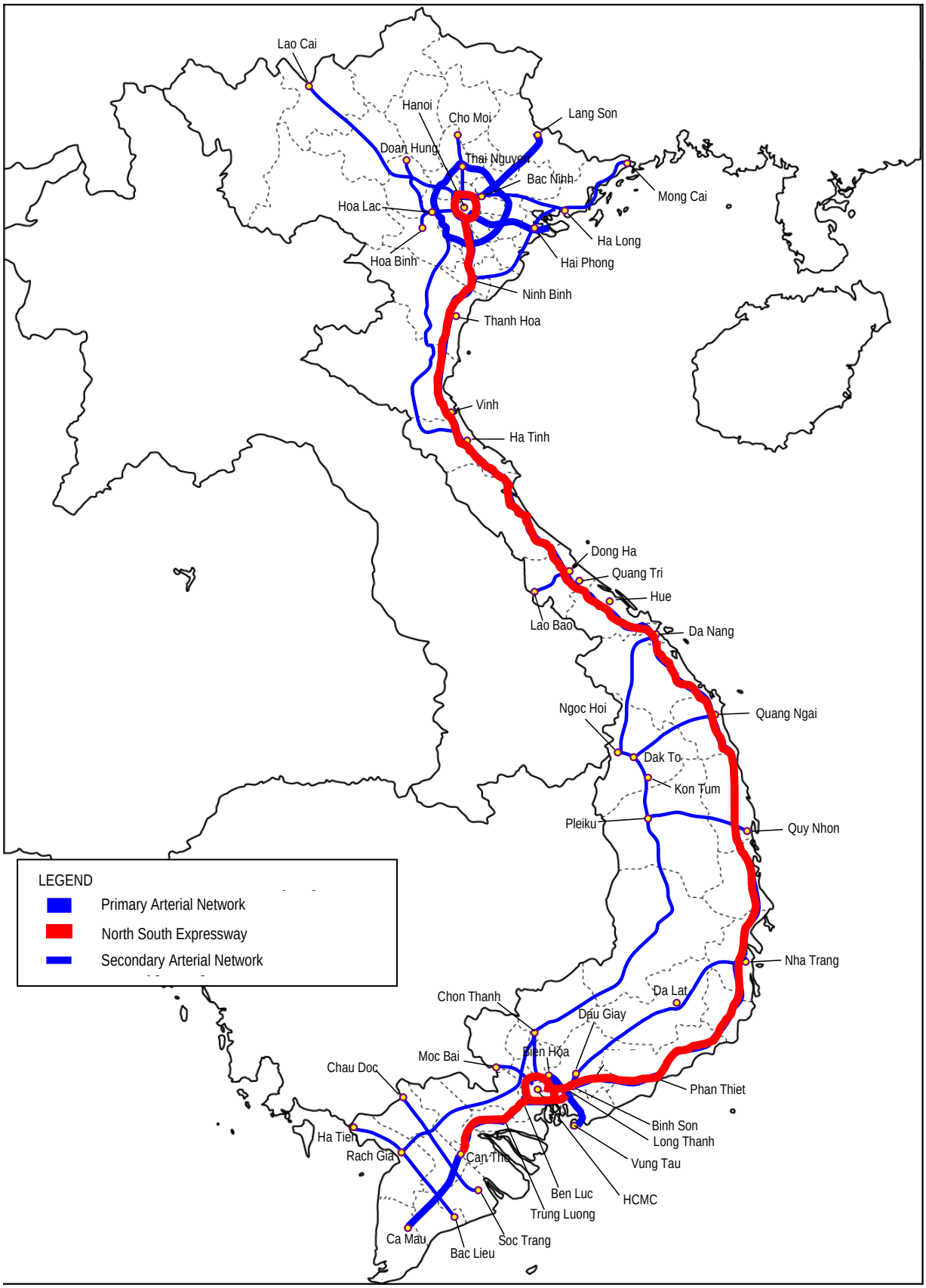
Source: Worked out by the study team based on various information
[1] VITRANSS2 Codes correspond to those in project list

3) Demand Analysis

5.23 The impact of expressways on overall transportation network especially on primary roads is significant. The network analysis shows that if the entire expressway network is completed it would accommodate 64% of car and 60% of bus traffic in terms of passenger-km and 71 % of freight traffic in terms of ton-km of total inter-provincial transportation demand in 2030. This means the traffic situation on primary roads are expected to improve significantly

5.24 The impact of NSHSR on expressways was also analyzed. The results show that about 6% to 8% of car/bus traffic would divert to NSHSR.

Figure 5.5 North–South Expressway Network in the VITRANSS2 Expressway Network[1]



Source: VITRANSS2 Study Team

[1] This is the maximum size of Expressway Network identified in VITRANSS2

4) Preliminary Evaluation

5.25 For each section of the expressway, economic and financial evaluation were undertaken preliminarily, based on the following assumptions.

(i) Opening year of expressway: 2020;

(ii) Project evaluation period: 30 years after opening;

(iii) Project cost: existing cost data was updated by the Study Team;

(iv) Operation and maintenance cost: 5% of project cost per year;

(v) Average growth rate of traffic: 4.9 %/year; and

(vi) Toll rate: US 5 cents/pcu/km

5.26 The result are shown in Table 5.6 and briefly described as follows:

(i) Many sections are economically feasible with more than 12% of EIRR. Some sections with EIRR close to 12% need extra measures to enhance the EIRR values;

(ii) On the other hand, all sections are not financially viable although Vinh – Ha Tinh, Ring Road 3 in HCMC and Cau Gie - Ninh Binh have relatively high FIRR; and

(iii) The above indicates that overall economic viability of the entire NSEXY is verified but the Government need to work out adequate mechanism to provide financial support in a way to maximize capability of private sector.

Table 5.6 Result of Economic and Financial Evaluation of NSEXY

Code	Section	Length (km)	PCU (000/day)	Cost (US$ mil/km)	EIRR (%)	FIRR (%)
H01	Ninh Binh–Thanh Hoa	75	80.1	11.0	15.3	8.3
H02	Thanh Hoa–Vinh	140	57.2	15.2	12.1	6.5
H03	Vinh – Ha Tinh	20	45.7	10.1	17.0	12.6
H04	Ha Tinh – Quang Tri	277	38.3	9.5	9.9	5.2
H05	Quang Tri – Hue	73	41.2	9.8	12.5	7.5
H06	Hue – Da Nang	105	37.5	16.9	10.3	3.5
H07	Quang Ngai – Quy Nhon	150	35.6	11.9	10.3	5.2
H08	Quy Nhon – Nha Trang	240	36.4	14.1	8.9	3.9
H09	Nha Trang – Phan Thiet	280	23.7	10.3	8.0	2.6
H10	Long Thanh–Nhon Trach–Ben Luc	45	30.2	16.4	15.9	5.4
H30	Ring Road No.4 in Ha Noi	90	7.7	15.0	14.5	8.0
H32	Ring Road No.3 in HCMC	83	47.2	14.8	13.7	10.9
CH01	Cau Gie – Ninh Binh	50	73.3	9.0	18.1	12.6
CH02	Da Nang – Quang Ngai	131	39.6	8.0	11.3	8.0
CH03	Phan Thiet – Gia Ray	100	39.6	19.1	11.9	6.8
CH04	HCMC – Long Thanh – Dau Giay	55	74.9	20.2	15.5	8.8
CH05	HCMC- Trung Luong	40	67.8	19.4	15.1	8.6
CH06	Trung Luong–My Thuan–Can Tho	92	39.1	16.4	11.3	2.8

Source: VITRANSS 2 Study Team.