Economic Research Institute for ASEAN and East Asia (ERIA)

Mekong-India Economic Corridor Development

Concept Paper

2009

Contents

List of Abbreviations

ADB	Asian Development Bank
AIF	ASEAN Infrastructure Fund
CDZ	Comprehensive Development Zone
CECA	Comprehensive Economic Co-operation Agreement
CFS	Container Freight Station
DMIC	Delhi-Mumbai Industrial Corridor
EAIC	East Asia Industrial Corridor
ERIA	Economic Research Institute ASEAN and East Asia
FMC	Fund Management Company
FTA	Free Trade Agreement
EWEC	East West Economic Corridor
GER	Gross Enrollment Rate
GMS	Greater Mekong Subregion
HRD	Human Resource Development
ICD	Inland Container Depot
ICPs	Integrated Check posts
JETRO	Japan External Trade Organization
JICA	Japan International Cooperation Agency
JODC	Japan Overseas Development Cooperation
MIEC	Mekong India Economic Corridor
MMLP	Multi Modal Logistics Park
NEDP	National Economic Development Plan
NESDB	National Economic and Social Development Board
PDF	Project Development Fund
PIF	Project Implementation Fund
PIFC	Project Implementation Fund Committee
PMC	Project Management Consultant
PPP	Public Private Partnership
SDDA	Single Dedicated Development Agency
SEZ	Special Economic Zone
SRT	State Railways of Thailand
SSBD	Southern Seaboard Development Project

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1. Background

The economic integration of East Asia has been unprecedented in recent years and has given rise to the formation of international production/distribution networks in various sectors such as machinery, textiles and garments. The integration has been supported by various regional/sub-regional cooperation frameworks such as ASEAN, ASEAN+3, East Asia Summit, Greater Mekong Sub-region Economic Cooperation (GMS), Brunei, Indonesia, Malaysia, Philippines (BIMP) East ASEAN Growth Triangle and Indonesia, Malaysia, Thailand (IMT) Growth Triangle.

Among multiple policies supporting robust integration among East Asian countries, Free Trade Agreements (FTA) have been under spotlight since the start of ASEAN Free Trade Area in 1992. Furthermore, "Economic or Industrial Corridor" concept has attracted significant attention to effectively promote economic integration of the region. Economic or Industrial Corridors constitute state-of-the-art transportation infrastructure such as modern expressway and high speed railway transportation that connect major industrial agglomerations, modern Airports, Special Economic Zones and other industrial infrastructures alongside the route -with enabling policy frameworks. Advantages to businesses and industries along the corridor include benefits arising from smooth access to the industrial production units, decreased transportation and communications costs, improved delivery time and reduction in inventory cost. The 'corridor' is thus intended to develop a sound industrial base, served by world-class competitive infrastructure as a prerequisite for attracting investments and industries particularly manufacturing. Sub-regional development initiatives such as GMS has employed Economic Corridor concept and achieved significant progress in the construction of road networks and transportation regulatory arrangements.

Recognizing the importance of corridors, the Economic Ministers during a meeting of ASEAN+6[1] endorsed the idea of an East Asia Industrial Corridor (EAIC) to be studied by Economic Research Institute for ASEAN and East Asia (ERIA) as the model project for the integration of East Asia. EAIC is envisioned to be region-wide comprehensive development plan, affirming the importance of linking the infrastructure development and industrial development planning.

EAIC further aims to facilitate and enhance economic growth by linking economies in East Asia.. EAIC is envisaged to be realized through development of several inter-regional industrial belts such as the Delhi-Mumbai Industrial Corridor (DMIC), East-West Economic Corridor (EWEC)[2], Southern Economic Corridor[2], etc. EAIC is an umbrella project and as part of this project, an important component in integration of East Asia and EAIC is linking India with Mekong region. ERIA conceptualized a corridor named **'Mekong-India Economic Corridor'** as a step towards this direction. The corridor based on Southern Economic Corridor alignment (Ho Chi Minh City-Phnom Penh-Bangkok) further extended to Dawei in Myanmar. Adding Dawei to this corridor links it with the Andaman Sea and connecting Mekong Region to India on its Eastern coast. Link to India is an important step towards realizing the potential for an East Asian Industrial Corridor.

2. The Mekong-India Economic Corridor

The Mekong-India Economic Corridor (MIEC) involves integrating the four Greater Mekong Countries viz. Myanmar, Thailand, Cambodia and Vietnam *(here-in after referred as Mekong Countries of MIEC)* with India through its east coast. It is proposed to connect Ho Chi Minh City (Vietnam) with Dawei (Myanmar) via Bangkok (Thailand) and Phnom Penh (Cambodia) and further linking to Chennai in India. Integration with India is likely to add momentum to corridor development

[1] Note: Ten ASEAN countries + six countries - People's Republic of China, Republic of India, Japan, the Republic of Korea, Australia and New Zealand

[2] ADB, 2005

due to growing trade and investment linkages between India and Mekong countries. The share of total trade of India with Mekong countries has more than doubled in a span of 15 years. India has signed partial FTA with Thailand and Comprehensive Economic Cooperation Agreement *(*CECA) with Singapore. India's FTA with ASEAN was signed on 13 August 2009 and FTA with Malaysia as individual country is under negotiation and close to signing.

The corridor would provide opportunities to individual countries of Myanmar, Thailand, Cambodia and Vietnam to build a strong economic and industrial base and a world-class infrastructure. The emphasis of the corridor is on expanding the manufacturing base and expand trade with rest of the world particularly India. The corridor will enable these economies to further integrate and collectively emerge as a globally competitive economic bloc.

MIEC is expected to augment trade with India by reducing travel distance between India and MIEC countries and removing supply side bottlenecks.

Table 1: Distance Comparison between India and MIEC Countries (with and without MIEC)

Country	Approximate *Current* Travel Distance between India and MIEC Countries (Km)	Approximate *Expected* Travel Distance between India and MIEC Countries (Km)
Thailand	4,500	2,500
Cambodia	4,200	3,000
Vietnam	4,200	3,500

The secondary alternative for possible connection between India and Mekong can be through Southern Seaboard located in South Thailand on Andaman Sea and borders with Malaysia. The Government of Thailand is developing a Southern Seaboard Development Project (SSBD) in the region on the similar lines of Eastern Seaboard project. Thus a route through SSBD forms an alternative to the Andaman Sea for MIEC which can be accessed through Pak Bara Port. The details of possible connection between MIEC and SSBD are appended in Annexure 3.

3. Corridor Alignment and Influence Zone

MIEC corridor is conceptualized to be the region around the main highway connecting Vung Tau in Vietnam to Dawei in Myanmar passing through Ho Chi Minh City, Phnom Penh and Bangkok. The highway passes through three borders of (i) Moc Bai-Bavet (Cambodia-Vietnam); (ii) Poipet-Aranyaprathet border (Cambodia-Thailand); and (iii) Sai Yok-Bong Tee (Thailand-Myanmar). There is an existing road from Vung Tau to Bong Tee on Thailand-Myanmar border, after which there is only unpaved path till Dawei. In addition to several major cities it covers key towns - such as of Bien Hoa (in Vietnam), Battambang, Sisophon (in Cambodia), Chachoengsao, Prachinburi and Kanchanaburi (in Thailand).

This road alignment connecting major economic centres will serve as the main transport spine for the corridor. The **Influence Zone** for the corridor is considered to be extended up to 80-100 km on

both sides of the alignment. For the purpose of development of this concept plan, the 'MIEC Corridor Region' is delineated as provinces which are majorly within 80-100 km of the influence zone. In order to optimize the development of corridor, it includes all key economic centres and seaport locations along western coast. MIEC Corridor region encompasses of the 21 provinces of Thailand, 17 provinces of Cambodia and 20 provinces of Vietnam. It covers an area of 265,000 sq. km. and constitutes about 25% of the total area of MIEC countries.

Map 1: MIEC Corridor Region

4. Vision for MIEC

The vision for the corridor is "to create a strong economic base that provides employment, reduces poverty, and promotes human resources development through provision of world class infrastructure and facilitation of trade between Mekong region and India".

5. MIEC Goals

MIEC project will be conceptualized to achieve the following goals:

- Enhance economic development and trade between India and Mekong region.
- Boost Investments in the corridor with focus on attracting FDI.
- Generate employment and opportunities for social development.
- Exploit underlying comparative advantages and complementarities within the corridor.

6. MIEC Objectives

In order to achieve this vision, the corridor will focus on the following objectives:

- To facilitate trade among member countries.
- To facilitate efficient movement of goods and people within the Corridor.
- To improve infrastructure in the Corridor to facilitate investments and industrial development.
- To achieve balanced regional development and distribute the benefits of future economic growth by promoting major economic zones in under-developed areas.
- To maximize private sector investments in the Corridor towards development of infrastructure and industries in form of FDI and Public and Private Partnerships.
- To maximize social development and employment opportunities.
- To strengthen the human resource potential of the MIEC region.

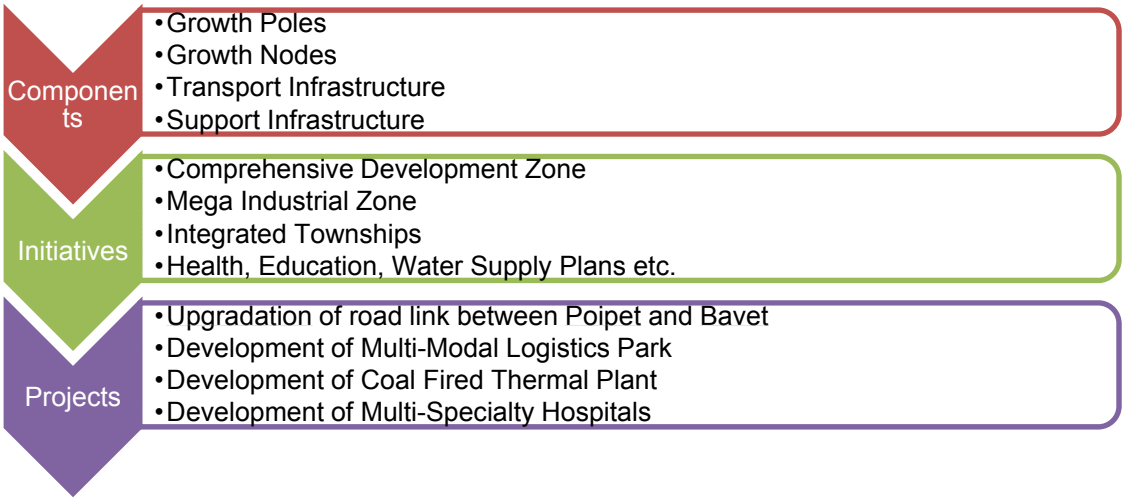
- Establish appropriate institutional arrangement to coordinate and facilitate development of the Corridor.

7. Components of MIEC

Development of MIEC envisages an integrated approach with a comprehensive regional planning perspective to transform the MIEC region into a major economic hub of East Asia. It will focus on building robust industrial and transport infrastructure for each of the countries, including promotion of industries based on locational strengths and exhibiting better efficiency in production. These industries along with good transport infrastructure provided by MIEC will promote inter-industry linkages, provide opportunity to countries to diversify their product lines, shift in production lines in emerging industrial MIEC economies. It is envisaged that high impact nodes are developed at the strategic locations in the corridor that will serve as engines of growth for the corridor. MIEC would therefore have four broad components:

- **Growth Pole:** Focal centre of economic activity or focal production blocks of national significance.
- **Growth Node:** Secondary production blocks or centres of economic activity with high potential to become future growth driver.
- **Transport Linkages:** To promote efficient linkages between the centres for economic activity, reducing service link costs and thereby attracting new production blocks to the corridor
- **Support Infrastructure:** Focuses on improving capacities of human capital to reduce costs in the production blocks and sustain long term development.

Figure 1: Link between Components, Initiatives & Projects and Exemplary Exhibition of Initiatives & Projects



After attaining a high-level of economic development, these nodes or production blocks would generate positive externalities thus also benefiting the region outside MIEC area. Further, MIEC concept has identified key ***Initiatives*** *for each* growth poles and nodes. These initiatives comprise of overall plans for the region related to Industrial infrastructure such as Comprehensive Development Zone[3], Integrated Townships, Transport and Support Infrastructure. MIEC in terms of infrastructure primarily deals with only the hard infrastructure development as the soft infrastructure issues (such as regulatory and legal framework, policy controls, required incentives, social development etc.) have been addressed by various other organizations. However, some of the important issues such as border infrastructure, power supply across countries have been addressed

[3] Note: Comprehensive Development Zone is a self-sustained area. Please refer to end note.

in the present report. These ***Initiatives*** have been molded into tangible **Projects** that can be implemented in the region. The components of MIEC have been discussed below:

7.1 Growth Poles

Growth Poles are focal centre of economic activity with national significance. They are usually big urban and industrial agglomerations that interact with surrounding areas spreading prosperity from the core to the periphery. These zones are at the heart of macro region of the country performing highly specialized secondary, tertiary, and quaternary activities. Growth poles will play two key roles in corridor development:

- Act as anchor for investments in entire corridor
- Facilitate development of secondary centres by providing forward and backward linkages to economic activities planned in secondary centres

Following Regions were selected as growth poles based on the regional analysis and factors such as region with high population, high density, high gross provincial product, established industrial base and clustering of industries:

Table 2: Identified Growth Poles in MIEC region

Name	Country	Brief on Growth Pole
Bangkok[4]	Thailand	Primary Industrial cluster of Thailand and largest urban agglomeration. The city is also a major regional financial and logistics hub.
Eastern Seaboard[5]	Thailand	Prominent Industrial cluster for Thailand with concentration of Manufacturing, Chemical and other industries. Also a hub of Automobile industry in East Asia, popularly known as “Detroit of the East” with more than 300 auto manufacturers, suppliers of auto parts and components
Phnom Penh[6]	Cambodia	Primary economic centre of Cambodia with concentration of major industries and services.
Ho Chi Minh City[7]	Vietnam	Largest metropolitan area in Vietnam and the most important economic centre in Vietnam accounting for largest contribution to Vietnam’s GDP. It attracts a major share of foreign direct investment in the country. .

7.2 Growth Nodes

Fragmentation theory is based on reducing set-up cost to develop production blocks and networks[8]. These nodes enable reduction by providing suitable investment climate through development of multiple Industrial Estates/zones with adequate infrastructure, one-stop services, simplification of setting up procedures, fiscal incentives, among others. These nodes can develop because of their

[4] Note: Comprises of six Provinces
[5] Note: Comprises of two Provinces
[6] Note: Includes Kandal province
[7] Note: Comprises of three Provinces
[8] ERIA, 2009 (A detailed note on this theory is provided in Annexure 1)

locational advantage; proximity to Growth Poles, availability of natural & human resources, large investment, fiscal incentives, etc. These nodes emerge as core areas of economic growth and benefit the surrounding areas. Growth Nodes would play three key roles in corridor development:

- Reduce cost of setting up businesses by provision of industrial facilities and investment facilitation
- Channeling the economic benefits to hitherto underdeveloped areas

Selection Criteria for Growth Nodes

In MIEC, following Growth Nodes have been identified based on:

- **Locational Advantage:** inherent strengths of specific locations like mineral resources, agriculture base, skilled human resource, potential for setting up specific group of industries.
- **Trends in investments and industrial development** in region
- **Proximity** to Key Economic Zones or Growth Poles
- Others such as **availability of incentives, proximity to ports**, etc.

A snapshot of the identified growth nodes is given below:

Table 3: Identified Growth Nodes in MIEC region

Name	Country	Brief on Growth Node
Chachoengsao-Prachinburi	Thailand	• Centrally located from Bangkok, Eastern Seaboard, Laem Chabang Port and Cambodia • Proximity to Suvarnabhumi Airport (Chachoengsao) • More fiscal incentives: Nearest to Bangkok among province with Zone 3 benefits (Prachinburi) • Emerging industrial hub with highest number of Industrial parks in Zone 3[9] (Prachinburi) and presence of anchor investors[10] • Proximity to large pool of labor force as located adjacent to highly populated North-eastern Thailand
Ayutthaya	Thailand	• Proximity to Bangkok • Existing industrial base with emerging cluster of electronic industry • Availability of trained labor force from educational institutions in adjacent Pathum Thani[11]
Kanchanaburi	Thailand	• Proximity to both Bangkok (about 150 Km) and Dawei (about 120 Km) • Emerging as major economic centre in Thailand clocking with over 10% growth annually • Robust existing industrial base particularly jewelry, agri-based like sugar, corn and others • High potential to emerge as major tourism hub • High potential for Agri-based industry as located amidst main agriculture belt of Thailand like Suphan Buri • Potential to emerge as major service centre due to anticipated border trade and emergence of Dawei as gateway port
Sihanoukville	Cambodia	• Presence of only deep sea port of Cambodia • Upgradation of rail link with Phnom Penh

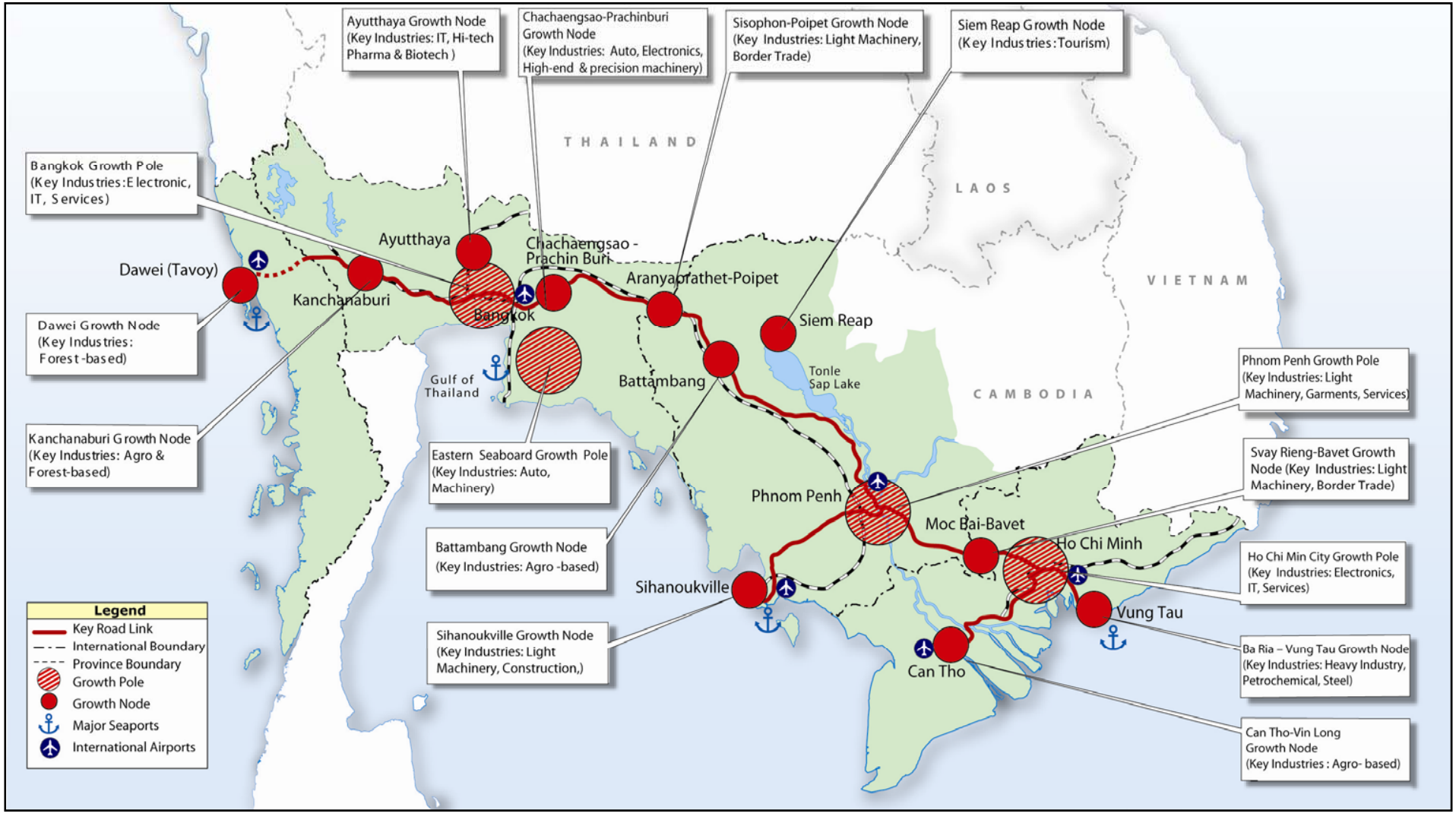
[9] Board of Investment , 1993

[10] Note: Hitachi GST

[11] Note: Asian Institute of Technology, Bangkok University etc

		• Large number of SEZs and industrial investments planned • Emerging tourist destination • Proximity to emerging O&G production areas (Khmer basin)
Battambang	Cambodia	• Nucleus of agricultural belt of Cambodia with large production of Paddy, Cassava, Corn, etc. • High Population concentration including surrounding provinces • Main commercial hub and Agri-service centre in Cambodia • Well-connected with Thailand and Phnom Penh
Svay Rieng-Bavet	Cambodia	• Proximity to industrial clusters of HCM City, Dong Nai, Binh Duong (about 100 Km) • Potential to emerge as key service centre due to anticipated border trade with industrial clusters in and around HCM City • Improved connectivity due to upgradation of road link with HCM City • Number of SEZs and industrials investments planned • Lower land prices than border area and availability of large parcels of land for industrial expansion
Sisophon-Poipet	Cambodia	• Proximity to industrial clusters of Bangkok, Eastern Seaboard and emerging Chachoengsao-Prachinburi (less than 250 km) • Potential to emerge as key service centre due to anticipated border trade with industrial clusters in and around Bangkok, Eastern Seaboard • Huge population in nearby provinces provides access to large labour pool • Proposed upgradation of road and rail link with Phnom Penh as well as Bangkok • Lower land prices than border area and availability of large parcels of land for industrial expansion
Ba Ria-Vung Tau	Vietnam	• Proximity to HCM City (less than 100 km) • Construction of Cai Mep-Thi Vai Ports (with upcoming capacity of 10 million TEUs) • Mega projects/ investments proposed in heavy industries such as Petro-chemicals, Steel, Shipbuilding, etc. • Proximity to largest natural gas production areas of the country (White Tiger, Lantay and Lando basins)
Can Tho - Vinh Long	Vietnam	• Centrally located in Mekong Delta (the agricultural belt of Vietnam) • High production of Paddy, Fruit and Vegetables in region and main agri-service centre • High population concentration in Mekong Delta • Good transportation linkages with HCM City and Cai Mep-Thi Vai Port • Main commercial and education hub in the region
Dawei	Myanmar	• Gateway of MIEC from South Asia, West Asia, Africa and Europe • Potential site for deep sea port of Myanmar • Rich in forest and timber resources • Potential to be tourism hub for Myeik Archipelago • Proximity to emerging O&G production areas (Yadana, Yetagun block)

Map 2: Location of Growth Poles and Growth Nodes in MIEC



7.3 Transport Linkages

Efficient linkage is the most important component of an Industrial/Economic Corridor. Fragmentation theory argues that reducing cost of service links is crucial to attract production blocks. One of the elements of reducing service costs is to develop a world-class transport infrastructure. MIEC proposes improvement of transport infrastructure with concerted and simultaneous actions on rail, road, sea, air transportation infrastructure and easing of cross-border movement of goods and passengers. The development of transport linkages will play two key roles in corridor development:

- Reducing logistic costs (one of key component of service link costs)
- Opening new channels for sourcing key factors of production

The vision of transport plan of MIEC is the development of a regional multi-modal transport network. Freight and passenger movement (intra-region and outside) can be made cost efficient by utilizing the most suitable mode of transport and enabling easy transfer between modes of transport. This will require coordinated action on rail, road, sea and air transportation infrastructure. Each of them is addressed below separately:

Roads

The road link from Bong Tee at Thailand-Myanmar border to Ho Chi Minh City is MIEC is main corridor. it is 1,131 km long with 61% link length as 2-lane road, 20% as 4-lane, 14% as 4-lane with service roads and 5% as 8-lane road. As per the analysis, 2-laned road sections in Thailand and Cambodia, and 4-laned sections in Vietnam would warrant capacity augmentation by 2010. Also due to the absence of bypasses to the cities of Phnom Penh and Ho Chi Minh, the long distance through traffic is required to wait at the city borders due to entry restriction of truck traffic during the day time causing delay in transportation of goods. In MIEC, roads or highways will continue to play a primary role in transportation & logistic movement. Thus the strategy for MIEC regarding road transportation would be:

- Upgradation of entire road corridor as access controlled facility
- Development of new service links with areas of economic growth
- Development of bypasses around major cities to facilitate long distance traffic movement
- Upgradation of road network to key economic centre and improve connectivity to rural areas.

Rail

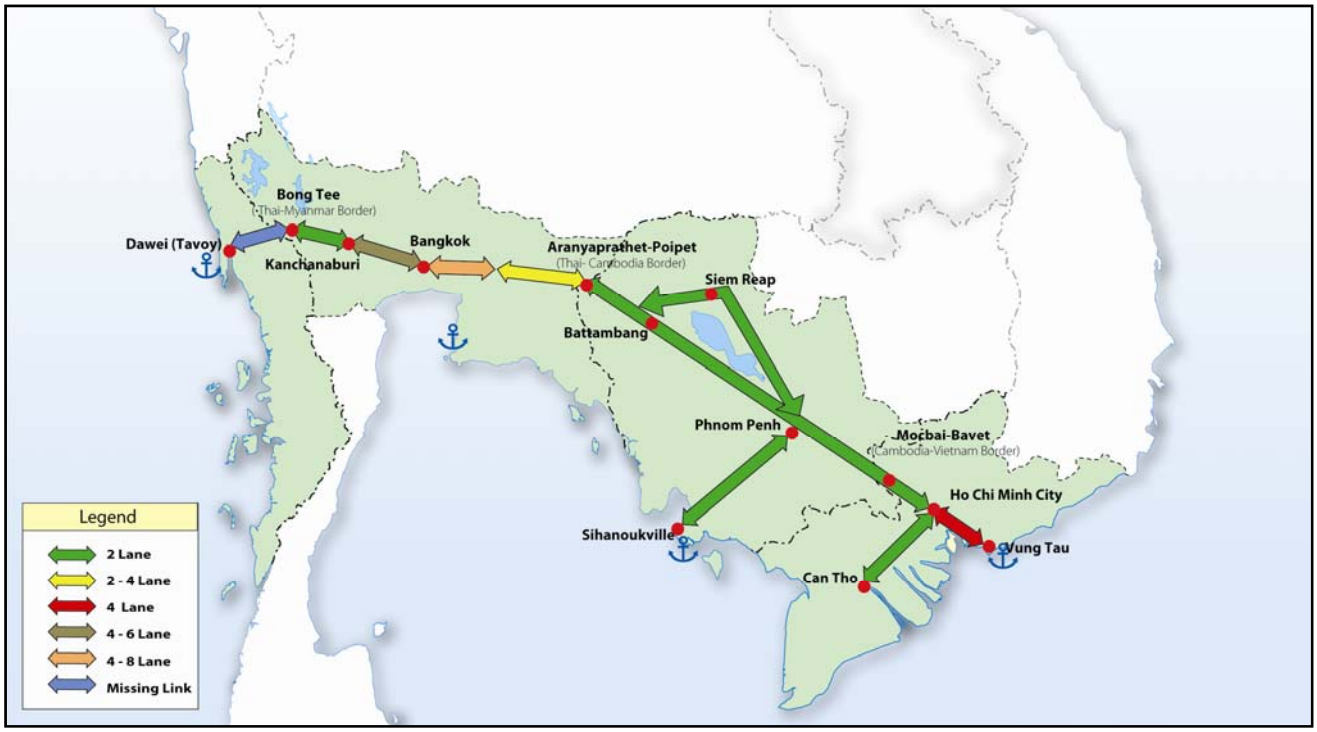
Rail is not widely used mode of transport in Mekong countries in MIEC. The share of rail transport is in total freight is low at 3%[12] (excluding Cambodia). Presently, the rail network has severe capacity constraints to deliver efficient and reliable services for heavy usage as axle load is low at less than 20 tonne (except Thailand). In order to develop multi-modal logistic chain, following strategy is suggested for development of rail transportation:

- Build the missing links to integrate the rail corridor between MIEC countries and upgrade existing rail network at key high volume routes
- Establishment of continuous end-to-end rail link for MIEC supported by spur rail lines
- Upgradation of rail track to meet potential traffic increase.

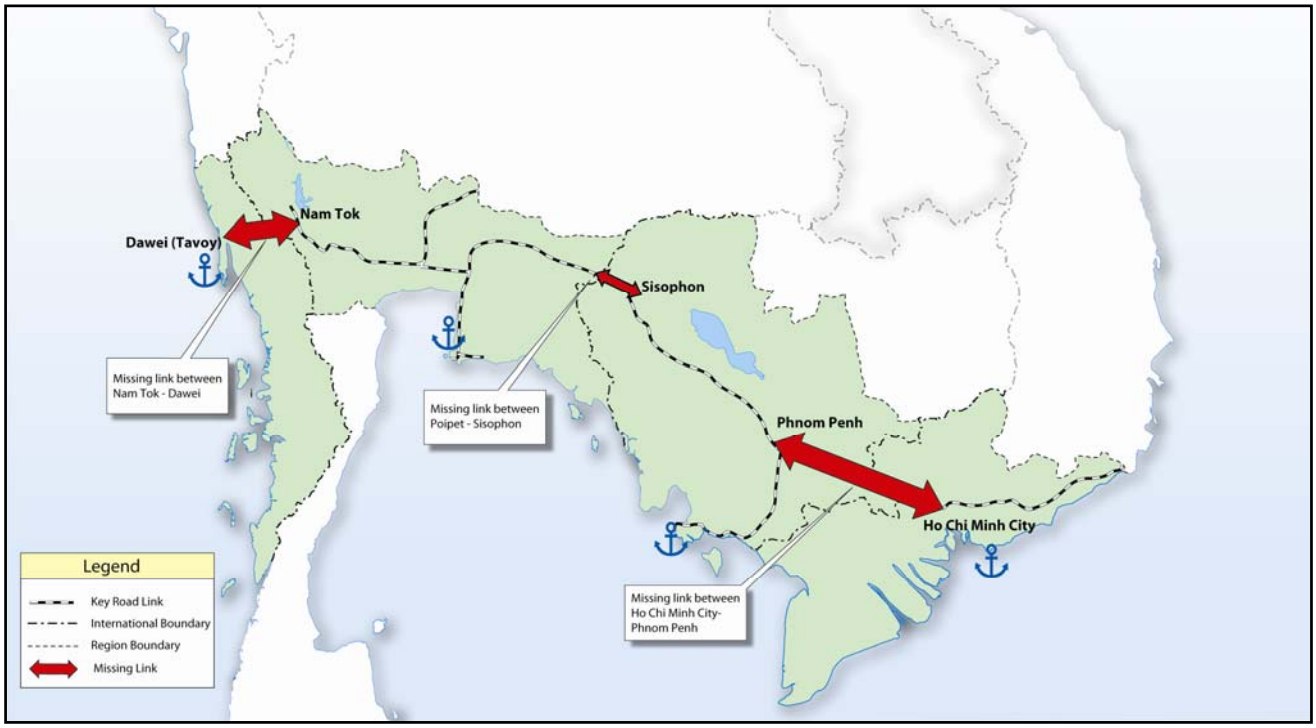
Given the present rail traffic volume, it is unlikely that cross-border freight volume will increase in initial years to make huge investments in Rail network. It is therefore proposed that priority shall be given to upgrading the key domestic rail networks which enables multi-modal transportation within the country. In later stages, investments in rail network shall be made to enable cross-border freight movement through rail network.

[12] JETRO, 2006

Map 3: Existing Lane Configuration of Road Network in MIEC



Map 4: Existing Railway Network in MIEC



Ports

Port network and sea transportation will be the main link of the region to the rest of the world particularly for bulk transport. Presently, ports[13] in MIEC are hub of maritime activity for GMS. Going forward, the ports would witness increased traffic due to development of corridor and increased trade of MIEC with the rest of the world. Based on current trends, it is estimated that the upcoming capacity will suffice till 2014, after which it may witness potential congestion problems. After 2014, there will be need to increase the current capacity to cater both expected growth[14] and incremental growth due to development of MIEC. Further, it shall also be noted that Mekong region needs efficiently operated ports facing Andaman Sea at this moment. Presently, all shipments from Mekong region to and from West go through Malacca Strait, which increases cargo-travel-time to India significantly. Malacca Strait is one of the busiest straits on the world shipping trade route with almost 35-40% of the world's container traffic and half of the world's oil annually passing through it[15]. This huge traffic leads to congestion in narrow strait. In addition to congestion, there is also risk of piracy and environmental damage due to increased ship movement. Given the strategic opening of MIEC on both East (South China Sea) and West (Andaman Sea), cargo movement through it can be avoided. Broadly the strategy suggested for development of ports in MIEC is as follows:

- Expansion of port capacities to meet growing traffic demand beyond 2014
- Development of deep seaport at Dawei and transshipment port at Vung Tau to reduce travel distance and time between India and Mekong countries and also to avoid congestion at Malacca Strait.

Airports

Air transport will play an important role in MIEC as it is an important mode of transportation for high-value fragile goods, perishable commodities and passengers. Presently there is a latent demand for air transportation since MIEC countries are amongst major producers and exporter of perishable commodities and hub for tourist destinations. With the realization of concept and progress on development plan proposed for MIEC in this concept paper, the trade in perishable commodities and high-value fragile goods is expected to grow significantly. The passenger (tourist) flow will also multiply as tourism potential of corridor is enhanced and new sites are developed. Thus the following strategy suggested for development of airports in MIEC is as follows:

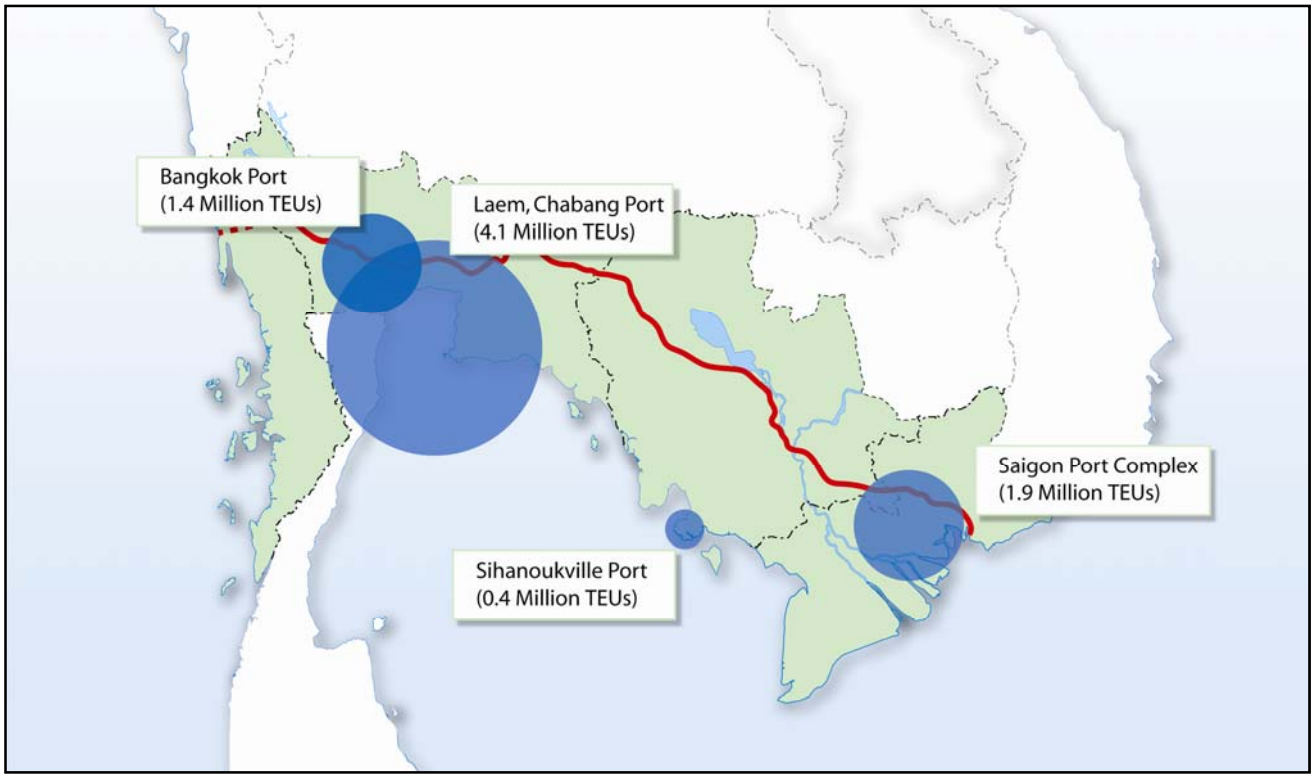
- Upgradation of key airports in MIEC to international standards in order to boost the tourism potential in key tourism zones or nodes
- Provide adequate airside and landside infrastructure to meet the growing demand for perishable cargo.

[13] UNESCAP, 2007

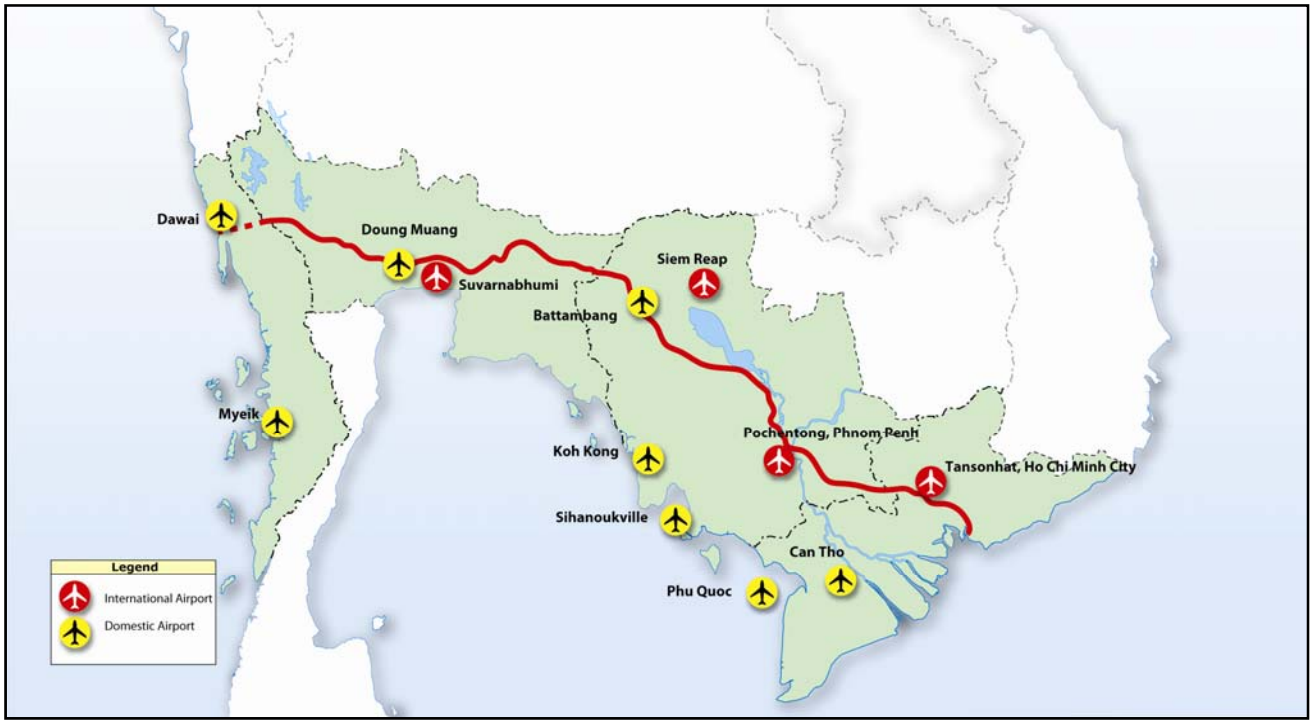
[14] Note: UNESACP estimates

[15] IMO, 2004

Map 5: Cargo Volume Capacity of Ports in MIEC



Map 6: Location of Existing Airports in MIEC



Cross Border Facilities

At present, the cross-border facilities are suffering from both soft and hard-issues. These include space for customs and immigration facilities, lack of warehousing and parking facilities, absence of no-man's land, lack of acceptance of mutual truckage and hassle free movement of persons across countries, etc. leading to operational inefficiencies and hassles to users. Also the cross-border check posts, especially at Poipet is very congested and does not have any additional land for expansion of the facility. In order to achieve seamless movement of freight and persons across countries, development of integrated cross-border facilities is proposed at the international borders of the countries in the corridor. There are three border points which fall in MIEC: (i) Bong Tee (Border between Myanmar and Thailand), (ii) Aranyaprathet-Poipet (Border between Thailand and Cambodia), and (iii) Bavet-Moc Bai (Border between Cambodia and Vietnam).

As part of MIEC, development of integrated international check posts (ICPs) is proposed on priority which would essentially have the following 4 major components:

- Sovereign activities like **Customs, Immigration, Border Security**
- **Cargo Terminal** including facilities like cargo loading/unloading and transshipment yards, office buildings scanning and examination area, warehouse, weigh bridges, truck parking, fuel repair facilities, driver dormitories etc.
- **Passenger Terminal** including office buildings, immigration counters, customs screening areas with baggage scanners, immigration and security offices, public and semi public service area etc.
- **Common Infrastructure** Facilities broadly include utilities within the ICP boundaries e.g. water and power supply networks, drainage and sewerage networks, solid waste management facilities.

Inland Container Depot/Logistics Parks

In Thailand there are two key existing Inland Container Depots (ICDs) [ICD at Lat Krabang (1.2 Mn TEU capacity) and ICD at Laem Chabang Port]. These ICDs are currently linked by a single rail track which causes delays due to necessity of switching tracks. The capacity augmentation of Lat Krabang ICD from existing 1.2 Million TEUs to 2 Million TEUs is underway along with double tracking of railway line from Lat Krabang ICD to Laem Chabang Port.

In Cambodia the two key ICDs are located at Phnom Penh and Sihanoukville along with other dry ports. In Vietnam the key ICDs are at Transimex, Tanamexco, Ben Nghe and Phuc Long which are primarily catering to domestic logistics needs.

The existing ICDs have several hardware side issues. The key issues in logistics chain are related to storage capacities and inefficient handling. Also the existing movement of freight from source to destination in the region is unorganized and mainly by roads. The lack of rail integration, storage and handling capacities at existing ICDs and (especially in Cambodia and Vietnam) result into wastage of energy and incurring high transportation costs.

Due to this reason the countries in corridor lack in logistic market which is affecting competitiveness of industry and impacting FDI. In order to overcome the logistics bottlenecks in the region significant investments are required to address gaps in "hard" infrastructure as well as "soft" infrastructure along with an integrated approach to enable region to "leap frog" into the developing logistic infrastructure category.

The strategy suggested for MIEC is related to augmentation of existing ICDs with rail integration and development of new multi-modal logistics parks on priority to cater to likely demand from ports expansion and facilitate 'Just-in-Time' inventory management to reduce cost of logistics in the region.

7.4 Support Infrastructure

Apart from transport, there are various key support policies or interventions required to support industrial development and reduction in productions costs[16]. Fragmentation theory argues that a key element of capturing dispersion forces is reduction in production cost per se in production blocks through various measures to strengthen location advantages[17].This can be enabled by building productive human capital through holistic approach of education, training, health, and reduction in costs of services such as energy costs.

Some of these interventions have direct implications and some like human resource development have indirect implication on production costs and competitiveness of economies. This Concept Paper focuses on two key interventions: (1) Human Resource Development, and (2) Power.

Human Resource Development

Building human capital is an important aspect of MIEC. HRD strategy would have two aspects: (i) Education and Skill development; and (ii) Health. There is huge disparity among the countries in MIEC in human resource development and each of the country has distinct issues:

Education and Skill Development: All four countries have different characteristics based on the demographics, existing education level and requirement of economy. Thailand, for instance, has a high Gross Enrollment Rate (GER) in Tertiary Education (46%), but it lags behind other High Income Countries like USA, Australia, UK which have GER of more than 60%. In Cambodia, the skill level of the workforce is largely inadequate for employment in industries. Moreover, unlike other countries in MIEC, it will have an advantage of 'demographic dividend' in the long run and would therefore need to provide a fillip to the education sector. Vietnam's GER, which is in the range of 11-14%[18], when nearly 65% of the population is below the age of 30 years, suggests that the tertiary education system is unable to meet the current demand for education in the country. In Myanmar, Secondary & Tertiary Education rates are very low. The enrolment rate for secondary education is 49% and tertiary education is mere 12% even though enrollment in Primary Education is 100%[19]. These figures show that all countries need attention to improve upon their tertiary education system and impart skills to its population which can cater to the needs of industries. The strategy suggested for education and skill development in MIEC would be:

- Provide facilities for tertiary education as per the requirement of the country
- Provide facilities for skill development or upgradation to meet requirements of industries in MIEC

Health: The availability of health facilities reduces the loss of man-hours and labor productivity due to timely treatment of illness. The health security of the workers has become imperative for investment decisions and the importance of health in improving the quality of life of citizens is well recognized. MIEC countries are very distinct in level of health services and each of them has different issues which need specific attention. It is evident from the above health indicators that Cambodia and Myanmar need urgent attention particularly in child and maternal care. There is need to add more hospitals and specialized healthcare facilities in Cambodia, Vietnam and Myanmar. The frequent health problems diagnosed are respiratory infections, Diarrhoea, Dengue fever, Cerebrovascular diseases, Septicaemia, Congestive heart failure and Pneumonia and Cancers. Furthermore, MIEC countries face acute shortage of health professionals i.e. Doctors, Nurses, Para-medics. Thus health sector requires a set of coordinated action on the following issues;

[16] Kimura. F, 2008

[17] Kimura. F, 2008

[18] Note: UNESCO estimates

[19] Note: Demographic dividend is a rise in the rate of economic growth due to a rising share of working age people in a population..

(i) Providing adequate health facilities including specialized facilities
(ii) Providing facilities to produce qualified medical professionals.

Power

It is evident that MIEC region is facing demand-supply mismatch and it is likely to continue in future with development of proposed Growth Nodes/ Poles and other industrial hubs. Several power projects are under planning or implementation stages but unable to meet the ever increasing demand for power. Thus MIEC will support development of power projects to reduce demand-supply gap, reduce electricity costs and improve generation. The strategy suggested for power sector for MIEC is as follows:

- Increase generation capacity to lower demand-supply gap in MIEC countries.
- Promote rural electrification and make proper use of available fuels
- Promote cross-border power trade
- Promote renewable or alternative energy sources.

8. Proposed Initiatives for Growth Poles

Bangkok Zone: Bangkok Zone serves as the chief growth pole of MIEC. The city is also a major regional financial and logistics hub. It is expected that the zone would grow further and major need to address problems of congestion, environment, transport, housing etc. One of the strategies could be adopt to promote satellite towns creating sufficient incentives for industries to move outside the zone. Following initiatives are planned for Bangkok Growth Pole:

Key Initiatives

- ✓ ***Comprehensive Development Zone (CDZ)[20]:*** *It is proposed that two Comprehensive Development Zones be designated in this Growth Pole clustered around Samut Prakan and Pathum Thani Thani provinces. Samut Prakan CDZ shall focus on expanding its electronic manufacturing industry to upstream value chain such as semiconductor material, diodes, transistors, etc. and downstream industries for exports like auto electronics. Pathum Thani CDZ shall focus on knowledge based industry i.e. IT/ITES/software and biotech.*
- ✓ ***IT/ITES/Biotech Parks:*** *Pathum Thani has potential to become hub/cluster of Knowledge-based industry because of high concentration of higher education institutions particularly in science and technology[21] and many research agencies in the province. Thus it can be developed as the preferred location for IT/ITES/biotech companies desirous of setting up/expanding their operations in GMS. The creation of Technology Parks like Thailand Science Park will further facilitate growth of knowledge industry.*
- ✓ ***Integrated Townships:*** *Pathum Thani and Samut Prakan have robust industrial activity that should continue to grow further. Thus it is proposed that an integrated township be developed as part of Comprehensive Development Zone. It would provide residential, institutional, commercial and leisure/recreation facilities for the workforce and resident population.* Integrated *townships will assist in of CDZs.*

Eastern Seaboard: For both export and local manufacturing, the Eastern Seaboard has become Thailand's destination of choice for foreign investors. The Eastern Seaboard is home to major automobile giants and has more than 300 suppliers of auto parts and components apart from the firms engaged in automotive assembly. Superior logistics facilities like Laem Chabang Port (one of the world's busiest

[20] Note: Comprehensive Development Zone is a self-sustained area. Please refer to end note.
[21] Note: Asian Institute of Technology, Bangkok University etc

container port) and motorways provide this region a good connection with rest of the world and facilitate easy import/export of goods. The following Initiatives are planned for Eastern Seaboard:

Key Initiatives

- ✓ ***Augmentation of Rail Link[22]:*** *Rail link between Laem Chabang Port and Bangkok (ICD Lat Krabang) shall be augmented to provide high-speed movement of cargo from port to rest of the country. The augmentation is proposed to reduce dependence on road, which has 68% share[23], leading to reduction in freight costs and congestion on roads.*
- ✓ ***Expansion of ICD/Logistics Hub[24]:*** *Expansion of the existing Inland Container Depot at Lat Krabang and establishment of a Logistic Park shall be taken to cater to expected demand due to growth of port traffic and planned expansion of Laem Chabang Port to 11 million TEUs. This project is underway along with double tracking of rail line to Laem Chabang Port.*
- ✓ ***Water Recycling Plant:*** *In 2005, Eastern Seaboard faced a severe water crisis and going forward the water demand will keep on increasing. Thus a large shared Water Recycling Plant might be built for industries in order to supplement the existing water supply and enable judicious use of water resources.*
- ✓ ***Desalination Plant:*** *Desalination Plant can be evaluated as an option for provision of water at later phases. Thailand has already established small desalination plants in Phuket. The economic and technical feasibility of construction of such desalination plant shall be conducted for Eastern Seaboard to supplement the water sources.*

Phnom Penh Zone: The economic activity of Cambodia centres in Phnom Penh and neighboring province of Kandal. In addition to promote industries, Cambodia needs to develop service industries like Financial Services, IT and other business services which play an important role in economic advancement. Thus the need would be to promote service industry in Cambodia building upon its 'demographic dividend'. Thus in addition to promoting industries Phnom Penh shall be developed as the main service centre for Cambodia. Following initiatives are planned for Phnom Penh Growth Pole:

Key Initiatives

- ✓ ***Comprehensive Development Zone:*** *It is proposed that a Comprehensive Development Zone be designated in this Growth Pole ideally clustered with existing industrial estates across two provinces Phnom Penh and Kandal. Cambodia has focused on SEZs for export promotion. However, this zone shall focus on promoting self-reliance by providing infrastructure to industries for domestic consumption. The development of industrial estates and supporting infrastructure in Phnom Penh will facilitate growth of industries related to machinery, tractors, vehicles, consumer goods, chemical fertilizers, pharma, among others.*
- ✓ ***Road Links/Development of bypasses around Phnom Penh[25]:*** *In order to avoid the non-destined long distance traffic entering into Phnom Penh, construction of a bypass around Phnom Penh is suggested. This would entail economic benefits to the city through savings in vehicle operating costs, reduced travel time costs as well as reduced pollution for the city.*

Ho Chi Minh City Zone: The zone witnesses significant amount of economic activity and is among the economically most developed regions in Vietnam. The rapid growth of the region has led to congestion. Thus, it is likely that rapid growth of Ho Chi Minh City would trigger economic growth of adjacent

[22] Note: Refer to Transport Linkages for detail discussions on Rail (page 13)

[23] Note: Road has 65% share in total Container Transportation of Laem Chabang. Source: Laem Chabang Port

[24] Note: Refer to Transport Linkages for detail discussions on Logistic Parks (page 17)

[25] Note: Refer to Transport Linkages for detail discussions on Roads (page 13)

provinces of Dong Nai and Binh Duong. The key initiatives planned for the HCM City zone are elaborated below:

Key Initiatives

- ✓ ***Comprehensive Development Zone:*** *It is proposed that a Comprehensive Development Zone be designated in this Growth Pole clustered around existing industries/estates in area between HCM City and Bien Hoa. The zone shall focus on attracting electronic industry. Saigon Hi-tech Park and upcoming investments like Intel's new chip plant will give fillip to cluster electronics industry as there would be important synergies that would be generated in the zone in terms of core technologies, human resource, etc. It shall integrate clusters of light machinery industries producing electrical machinery, general machinery and its parts and components.*
- ✓ ***Software Technology Parks:*** *Software industry in Vietnam is a 'sun-rise' sector and Vietnam has potential to emerge as a major software sourcing destination in Southeast Asia. Zone. The park based on Indian development model can be important tool to facilitate growth of software industry[26]. Software Incubation Centre shall be also housed as an integral part of software park to provide workspace for start-ups. It shall also house a research institution for R&D activities.*
- ✓ ***Integrated Townships:*** *Bien Hoa has potential to be developed as satellite to HCM City. It already has robust industrial activity[27] and continues to get huge chunk of foreign investment to Southern Vietnam. Thus it is proposed that an integrated township be developed as part of Comprehensive Development Zone.*

9. Proposed Initiatives for Growth Nodes

Chachoengsao-Prachinburi Growth Node (Thailand): Chachoengsao-Prachinburi showcases necessary potential to be developed as future industrial hub with focus on electronics, auto parts and components, high-value engineering machinery, etc. The key initiatives planned for Chachoengsao-Prachinburi growth node are given below:

Key Initiatives

- ✓ ***Mega Industrial Zone:*** *It is proposed that Mega Industrial Zone be designated in this Node clustered around existing Industrial Estates in Chachoengsao and Prachinburi. The auto parts industry in Thailand manufactures most of the components used in automotive assembly and showcases sufficient skills. However, some of the high-end components[28] are still imported. Thailand can now focus on moving up the value chain and produce these components in-house. This area emerges as potential location for manufacturing firms for high-end auto parts because of proximity to Eastern Seaboard. MIZ will also house a Skill Development Centre providing specialized courses in electronics application, precision mechanics as well as industrial, mechanical, electrical engineering to meet up with skilled labour demand of industries.*
- ✓ ***Integrated Township:*** *Since Chachoengsao-Prachinburi can emerge as potential cluster of manufacturing industries, there would be need to provide residential, institutional, commercial and*

[26] Note: India established many Software Technology Parks like Bangalore, STPI Chennai, STPI Hyderabad, STPI Mangalore, among many others.

[27] Note: Light machinery producing electrical machinery, general machinery and its parts and components are main industries.

[28] Note: Like Electronic-fuel injection systems, Moulds and Dyes, Jigs and fixtures, Anti-lock Braking Systems, Substrates for Catalytic Converters, etc.

leisure/recreation for workforce. Thus it is proposed that an integrated township be developed dovetailing on Mega Industrial Zone.

Ayutthaya Growth Node (Thailand): Ayutthaya province already has established industrial activity with high concentration of hi-tech industry like electronics. It should be developed as multi-industry zone with electronics as mainstay. It can be looked as a future growth node because of its proximity to Pathum Thani, the emerging knowledge hub. Ayutthaya should take advantage of talent pool available at Pathum Thani by focusing on complementary industries like high-end electronics, IT, pharma/biotech. Key initiatives for the growth node are as below:

Key Initiatives

- ✓ ***Mega Industrial Zone:*** *The new Industrial Estate or augmentation of existing Industrial Estates will be planned as part of Mega Industrial Zone. Thailand has potential to expand its electronic manufacturing industry. The zone will focus on attracting hi-tech Industry like upstream electronics value chain such as semiconductor material, diodes, transistors etc. MIZ will also house a Skill Development Centre providing specialized courses in Software Engineering, Advance Computing, Electronics Application, etc.*
- ✓ ***Pharma and Biotech City:*** *Pharma sector has significant potential in Thailand[29]. Pharma city would provide companies with world-class environment for R&D, clinical trials, manufacturing and marketing bulk drugs and formulations. The park would be based on concept of 'cluster research[30]' that creates research communities where biotech and pharma complement each other. Therefore, an 'integrated' bio-tech and pharma cluster can be developed to attract major pharma Industries to be based inside the city. Unlike Thai Science Park in Pathum Thani, this will cater to pharma industry (Bulk drug makers, Generic drug makers, Formulation units) and Medical Biotech Companies, Stem Cells Labs, Clinical Trial Labs, Contract Research Organization, Preclinical Research Firms, etc.*

Kanchanaburi Growth Node (Thailand): Kanchanaburi can be developed as multi-industry growth node because of its proximity to Myanmar and based on its industrial, agricultural and tourism potential. With development of the corridor and the port route through Dawei, the border trade is expected to increase exponentially and this node could emerge as major service centre. It has potential to emerge as major tourism hub with proximity to numerous national parks, waterfalls, Neolithic-era caves, etc. Agriculture is principal activity in the hinterland with majority of population engaged in agricultural sector[31]. Presently the key industries in Kanchanaburi include Sugar, Agricultural products like Corn, Pulp, Paper, etc. and Jewellery. The growth node can expand its industrial base by focusing on augmenting its agro-based industries as provinces of Suphanburi and Kanchanaburi are major agricultural production areas. Following initiatives are planned for this Growth Node as presented below:

Key Initiatives

- ✓ ***Mega Industrial Zone:*** *It is proposed that Mega Industrial Zone be designated in this Node encompassing existing Industrial Estates in Kanchanaburi province. The new Industrial Estate or augmentation of existing Industrial Estates will be planned as part of Mega Industrial Zone. The zone*

[29] Note: Its population is ageing, it relies heavily on imports for meeting its health care needs & plans to establish itself as Healthcare Centre of Asia. Thus growth of Pharma & Biotech Sector will become vital to Thailand.

[30] Note: Cluster Research' is identified as key strategy in National Biotechnology Policy Framework 2004-09 of Thailand

[31] Note: According to UNESCAP data, 56% of the total population was engaged in agricultural sector in Kanchanaburi, 60% in neighboring Suphanburi

shall be multi-industry zone with focus on food processing and forestry-based industries. A Skill Development Centre providing general courses on industrial, mechanical, electrical engineering will be developed in MIZ to meet up with skilled labour demand of industries.

- ✓ ***Kanchanaburi Eco-Tourism Zone:*** *An eco-tourism zone could be created at Kanchanaburi focused on its heritage and natural beauty. The region would have leisure and sports function with facilities for camping, angling, elephant safari, cycle safari, riding trail, canoeing, white water rafting, rock climbing/mountaineering, and other adventure sports. A zone with projects like Eco-park and Campsite, Adventure Sports Complex and Resort Town can be developed.*
- ✓ ***Centre for Food Safety and Research:*** *With increased focus on agro based industries, a dedicated centre for food safety and research and training shall be established in order to assist and advise food processing companies to comply with the GMP and HACCP[32] standards or standards prescribed by individual countries. Food safety is an important issue for region due to outbreak of SARS, Avian influenza. The centre shall have facilities like quarantine, food testing labs, certification labs, basic food safety training. It can collaborate with existing initiatives on promoting food safety by institutions like Thai Small Industry Finance Corporation, National Food Institute.*

Further the Government of Thailand is developing a Southern Seaboard Development Project (SSBD), located in South Thailand on Andaman Sea and borders with Malaysia, in the region on the similar lines of Eastern Seaboard project. This forms a secondary alternative for possible connection between India and Mekong and thus has been considered as future growth node. For details on SSBD, please refer to Annexure 3.

Sihanoukville Growth Node (Cambodia): Being the only deep-water port of Cambodia, this zone is emerging as hotbed of industrial activities with many SEZs being planned in this region. Going forward with large number of SEZs and planned industrial investments, this region is likely to attract downstream industries which may lead to clustering effect. This region also has a high potential to emerge as a key tourist destination in MIEC. The key Initiatives for this node are given below:

Key Initiatives

- ✓ ***Mega Industrial Zone:*** *The proposed zone can be created along National Route No.4 and clustered with planned SEZs. It will be multi-industry zone with Light Industries like, Textiles-Garments, low end mechanical products, construction materials, consumer goods, etc. as the key industry mainly catering to export markets. MIZ will also house a Skill Development Centre providing training in industrial, mechanical, electrical engineering to meet up with skilled labour demand of industries.*
- ✓ ***Sihanoukville – Koh Kong Tourism Zone:*** *Eco-Tourism corridor could be created on the west coast of Cambodia focusing on beaches (narrow stretch of west coast), islands (Koh Kong, Kiri Sakor, Koh She, Koh Thmei) and also including biodiversity zone of Cardamom Mountain. This area's natural beauty remains untapped and MIEC will support its development as tourism destination. Sihanoukville will act as the gateway for zone and connectivity with the zone shall be strengthened. A zone with facilities like Eco Park, Lodges and Campsite, Beach/Resort town, Tourist Facilitation Centre, shall be developed. Projects like Water Front, Marina shall be undertaken in Sihanoukville.*
- ✓ ***Upgradation of Sihanoukville Airport***[33]*: In order to boost tourism, MIEC will support upgradation of existing airport at Sihanoukville with connectivity to international destinations and all key airports in MIEC.*

[32] Note: GMP: Good manufacturing Practice; and HACCP: Hazard Analysis and Critical Control Point are a systematic preventive approach to food safety and pharmaceutical safety. It addresses various physical, chemical, and biological hazards during the production or processing process as a means of prevention rather than finished product inspection. They are recognized internationally as a logical tool for food safety system and certification.

[33] Note: Refer to Transport Linkages for detail discussions on Airports (page 15)

- ✓ ***Seafood Processing Park[34]:*** *Cambodia exports its fish mainly to Thailand and it mainly consists of frozen and live fish, where further value-addition is done. The same value addition can be done inside Cambodia by providing adequate facilities to fish processing industries. Thus a dedicated Seafood Processing Park for processing units with specialized facilities like cold storage, sorting and grading lines, chill room, ice factory. and a Boat-Yard for repairing and building new boats, shall be developed in Sihanoukville.It will also have a specialized Fisheries Training Centre[35] for providing skills training to the fishing communities/fishermen of the area as well as training for workers for meeting need of processing units.*
- ✓ ***Integrated Township:*** *Since Sihanoukville will emerge as major industrial and tourism centre, there would be need to provide residential, institutional, commercial and recreation facilities for workforce, their families as well as tourists. Thus it is proposed that an integrated township be developed dovetailing on Mega Industrial Zone.*

Battambang Growth Node (Cambodia): Battambang province has a strong agricultural based economy. It is known as the rice bowl of Cambodia. In addition to rice, other crops like corn, cassava, sweet potatoes, green beans, chilies, ground nuts, soybean, jute, sugarcane, are also grown in Battambang and provinces around it. This area has potential to be developed as 'food processing hub' for Cambodia because of availability of raw material. In order to fully exploit the potential of the sector, the initial focus of development would be improving farm productivity and basic value addition such as milling, pre-processing.

Key Initiatives

- ✓ ***Food Processing Park:*** *This Park will have developed plots and requisite infrastructure for setting up agro-processing units for primary processing of fruits and vegetables, rice milling and grading, packaging units, etc.*
- ✓ ***Integrated Agro-Market Complex:*** *The integrated agro marketing complex will have space for wholesale market to facilitate trading of agricultural produce and serve the need for processing units as well. It will serve as common collection centre for agro and horticulture products and will facilitate centralized procurement for processing units. The wholesale market will be equipped with large facilities on warehousing and also cold storage facilities to facilitate in minimizing post harvest losses. The complex will be equipped with modern amenities like central electronic auction system, mechanized handling, and wholesale block-cum-godowns. The region also has significant fruit, vegetable production and therefore there is need for specialized automatic electronic grading-sorting lines and a trimming –washing-grading- packing lines, among others. Apart from these facilities it will have common services like agro waste processing, space for Banks, traders, service providers, transporters..*
- ✓ ***Agriculture University:*** *The proposed university will be set up to stimulate agricultural research, create professionals, train farmers, which will improve agricultural productivity of the region. There is no such university in Cambodia and an Agricultural University[36] would boost ongoing efforts in removing pre-harvest impediments and post-harvest crop management. These universities play a key role in larger rural development efforts.*

[34] Note: For example, a Seafood Processing Park has been developed in Kozhikode in India

[35] Note: These training centres will impart training on aspect of fish processing and preservation, fishing methods and gear technology, seamanship, boat building, etc. Many countries have started marine Fisheries Training Centres like India, Fiji Islands, Mauritius, Guinea, etc.

[36] Note: There many Agriculture Universities in the world like Punjab Agricultural University, Agricultural University of Athens, Agricultural University of Iceland, Warsaw Agricultural University, China Agricultural University, Hanoi University of Agriculture. India itself has more than 30 Agriculture Universities have been developed in India.

- ✓ ***Farmers Training Institute:*** *This facility will be set up to facilitate farmers in upgrading their know-how, inform them about new innovations in agriculture that would eventually help to boost agri-production. The institute will educate farmers about agricultural methods, use of farm implements, etc. It will also encourage farmers to produce quality products. The institute will be equipped with hostel for farmers, exhibition hall, library, soil testing laboratory, hydroponics plant house, greenhouses, nursery labs, etc. The co-location of Agriculture University and Institute in a zone will facilitate sharing of resources and knowledge.*
- ✓ ***Pre-Harvest Facilitation Centres:*** *These centres will be opened up to provide knowledge on techniques for farming, information, services, and tools and thus support farmers. It will have specialized equipment banks, seeds distribution bank, quality-check labs, agro-information centre, agro-clinic for crop rescue in case of any disaster, crop disease monitoring.*

Siem Reap Growth Node (Cambodia): This region is bestowed with sites showcasing its rich heritage and culture. Angkor Wat is the main tourist attraction and Tonle Sap and a few of the villages around it could be promoted for cultural tourism. A few villages can be marketed as floating villages for cultural tourism. This would increase income of the villagers and enable all round social development. Due to presence of international airport, it can also become gateway for untapped heritage sites of Preah Vihar and Battambang. The key Initiatives for this node are given below:

Key Initiatives

- ✓ ***Heritage Zone:*** *MIEC will support development of a heritage zone in Siem Reap. This corridor would have historical and cultural viewing functions such as exploration of cultural ruins, and heritage circuits, community-based tourism focusing on floating villages around Tonle Sap like Peach Kuntil, Kbal Taol and Prek Kr. The zone will have tourism facilities like Museums, Craft Villages, Theatre for performances of Folk Artists, apart from Hotels, Guest Houses, Tourism Facilitation Centres, etc. It will also provide facilities and circuits to visit untapped heritage sites of Battambang & Preah Vihar. Siem Reap shall also be promoted as key MICE[37] destination of Cambodia and thus a Convention Centre be developed in this zone.*
- ✓ ***Road Link***[38]*: In order to facilitate the corridor, it is proposed to augment the capacity of the road link from Siem Reap to Battambang passing through Sisophon. The high speed corridor will reduce travel time between the two centres and facilitate faster movement of passenger vehicles.*

Sisophon-Poipet Growth Node (Cambodia): The economy of Sisophon is primarily based on border trade between Thailand and Cambodia. Its proximity to key industrial clusters in Thailand offers immense potential to attract industries with forward linkages to industries in Thailand. Thus it can be promoted as key industrial zone and emerge as Growth Node. The light manufacturing industries such as low-end auto components (tyres, wheels, glass components, etc.), simple parts and components and finished products[39] of general machinery can be promoted here as they can gain from markets in Thailand, Bangkok, Eastern Seaboard, and emerging Chachoengsao-Prachinburi. It will benefit both Cambodia and Thailand. Thai industry can outsource some of its manufacturing activity to take advantage of lower wage rates in Cambodia, which in turn would gain from creation of employment and investments. Sisophon also offers advantage of lower land prices than border areas of Poipet. The key initiatives for this node are given below:

Key Initiatives

[37] Note: Meeting, Incentive, Convention & Events

[38] Note: Refer to Transport Linkages for detail discussions on Road (page 13)

[39] Note: Plough Machines, Pulley Tuckle, Jacks, Machine Tools for Drilling, Boring

- ✓ ***Special Economic Zone (SEZ)/Free Trade Zone (FTZ):*** *SEZ or FTZ shall be established at Sisophon to gain from proximity with Thailand. It would focus on Light industries particularly low end parts and components from Cambodia which are exported to industries in Thailand for assembly. Such a zone will boost cross border trade between Thailand and Cambodia. It will also house a Skill Development Centre providing training in industrial, mechanical, electrical engineering to meet up with skilled labour demand of industries.*
- ✓ ***International Trade Exchange Centre:*** *The border trade is expected to grow between Thailand and Cambodia. Poipet shall act as a service centre for the anticipated growth in cross border trade. In order to facilitate trade related activities, a Trading Centre is proposed to be set up at in this zone. The centre will have office space, Product Display Centre, Warehousing Facility, Customize Packaging and Repackaging facility, Banking and Foreign Exchange offices, Meeting rooms, Conference halls. etc for traders or industries. These facilities will provide requisite infrastructure to support trading activities.*
- ✓ ***Integrated Township:*** *Sisophon may emerge as key industrial zone and thus there would be need to provide residential, institutional, commercial and leisure/recreation facilities for workforce and their dependents. Thus it is proposed that an integrated township be developed dovetailing on SEZ. Cambodia needs sufficient urban amenities like schools, health centres, water supply, solid waste management, etc. and these townships will provide platform for developing such urban amenities.*

Svay Rieng-Bavet Growth Node (Cambodia): This node is located in close proximity (less than 120 Km) to key industrial region of HCM City and South Vietnam and therefore offers immense potential to attract industries with forward linkages to industries in HCM City and South Vietnam. Emerging industrial activity in provinces of Dong Nai, Binh Duong, Ba Ria-Vung Tau will further support its promotion as key industrial zone. Light manufacturing industries such as low end parts and components of electrical machinery (parts of domestic appliances, compressors, engines, motors), Garments can be promoted here as this market can gain from markets in HCM City Growth Pole. The key initiatives for the said growth node are given below:

Key Initiatives

- ✓ ***Special Economic Zone/Free Trade Zone:*** *SEZ or FTZ shall be established in this zone to gain from proximity with HCM City. It shall host industries which can supply parts and components to industries in South Vietnam as well as consumer markets in Vietnam. This SEZ/FTZ will also house a Skill Development Centre providing training in industrial, mechanical, electrical engineering to meet up with skilled labour demand of industries.*
- ✓ ***International Trade Exchange Centre:*** *With expected growth in the border trade between Vietnam and Cambodia, a trade centre with facilities like office space, product display centre, warehousing facility, customize packaging and repackaging facility, Banking and Foreign Exchange offices, Meeting rooms, Conferences halls etc. shall be established at border. These facilities will provide requisite infrastructure to support trading activities.*

Ba Ria-Vung Tau Growth Node (Vietnam): It has potential to be developed as future industrial hub matching scale and economies of Eastern Seaboard with focus on heavy Industries like petro-chemicals, steel, shipbuilding, among others. A big refinery and downstream industries are planned along with many steel industries. Many domestic and major international corporations have planned their investments here such as South Korea-based Posco's steel plant of 3 Million TPA, Vietnam Rubber's 5 Million TPA plant, India-based Essar, Vietnam Steel, among other big companies. Development of these heavy industries will spawn number of downstream & ancillary industries and will bring high industrial production value for the entire province. The initiatives are given below:

Key Initiatives

- ✓ ***Mega Industrial Zone:*** *It is proposed that Mega Industrial Zone be developed in this Node ideally clustered with existing industries/estates and planned projects like upcoming Refinery and port capacities at Cai Mep-Thi Vai, etc.. The Zone will also cater to upcoming key Petrochemicals, Steel, and other Heavy industries which in turn bring in downstream industries. MIZ will also house a Skill Development Centre providing training in industrial, mechanical, electrical engineering to meet up with skilled labour demand of industries.*
- ✓ ***Petro-Chemical Complex:*** *It is proposed that a specialized complex or industrial estate be established in Ba Ria – Vung Tau with requisite infrastructure for Petrochemical Industries. It should be ideally clustered with upcoming Refinery. This industrial estate will house exclusively to downstream petro-chemical industries like Olefin and Plastic, Ethylene and Polyethylene, PET, Polyester, aromatic – Derivatives, Compounds which have complementarities among themselves.*
- ✓ ***Seafood Processing Park:*** *Vietnam is among the top ten exporters of seafood to the world and Ba Ria-Vung Tau is among the major centre for seafood trade in Vietnam. The proposed park will have seafood processing units as well as production units for ready-to-eat seafood products. It will have other supporting facilities like chill room, ice factory, data management and communication centre, and a Fisheries Training Centre for training fishing communities/fishermen and training for workers of processing units.*
- ✓ ***Integrated Township:*** *Since Ba Ria-Vung Tau region will emerge as another big cluster of industries, there would be need to provide residential, institutional, commercial and leisure to accommodate resultant population Thus it is proposed that an integrated township be developed dovetailing on Mega Industrial Zone.*
- ✓ ***Vung Tau Tourism Zone:*** *It can be developed in lines with the Sihanoukville Tourism Hub. It will have sports and leisure functions with activities like water scooters, parasailing, jet skies wakeboarding, knee boarding, waterskiing, etc. Vung Tau's tourism potential can be strengthened by developing tourism projects like Marina, Water Sport Complex and Water Front Development.*
- ✓ ***Road & Rail Link***[40]*: In order to facilitate high-speed movement of cargo from Cai Mep-Thi Vai Ports to hinterland, an expressway and a rail link between Ports, Mega Industrial Zone and HCM City shall be constructed. This link is proposed to enable speedier cargo movement between upcoming port and HCM city and prevent congestion which will increase the logistic costs for industries in this node.*
- ✓ ***Transshipment Port***[41]***:*** *It is proposed that a Transshipment Port be developed in Ba Ria-Vung Tau.*

Can Tho-Vinh Long Growth Node (Vietnam): Can Tho-Vinh Long provinces are located in middle of the Mekong River Delta[42] which is among one of the most agri-productive regions of the world. This area is known for highest cropping intensity and major products are rice, fruits and vegetables. This area has immense potential to be developed as food processing and export hub because of abundant availability of raw material. The region already exports about 90% of rice and 28% of vegetable output. Thus focus of MIEC in this node would be on attracting food processing companies and provide requisite infrastructure to help minimize post-harvest losses. The key initiatives planned for the node are:

Key Initiatives

[40] Note: Refer to Transport Linkages for detail discussions on Rail (page 13)

[41] Note: Refer to Transport Linkages for detail discussions on Rail (page 13)

[42] Note: It includes provinces of Can Tho, An Giang, Bạc Liêu, Ben Tre, Ca Mau, Dong Thap, Hau Giang, Kien Giang, Soc Trang, Tien Giang, Tra Vinh, Vĩnh Long

- ✓ ***Food Processing Park:*** *This park will have developed plots and requisite infrastructure for setting up Agro-processing units for processing of canned and ready-to-eat (RTE) fruits and vegetables, frozen and chilled commodities, snacks (rice crackers, noodles, cornflakes) and health food.*
- ✓ ***Integrated Agro-Export Complex:*** *The complex will facilitate export of raw and packaged foods to various countries. This complex will be equipped with large facilities on warehousing, cold storage facilities to facilitate in minimizing post harvest losses. The complex will be equipped with modern amenities, mechanized handling, automatic electronic grading sorting line, etc. The region also has potential in Floriculture and the export zone will have specialized Floriculture zone for Flower grading, sorting, and packaging units. The processing units will serve foreign markets also therefore a provision for export facilitation centre will be made which will have a separate block for exporters with customize packaging facility, pallet building station, quarantine and customs inspection, walk-in-cold rooms, a small logistics park and other facilities such as common agro waste processing plants, space for banks, traders, service providers, transporters..*
- ✓ ***Food Processing Training Centre:*** *This centre will have facilities and courses for training on various aspects of food processing in fruit, vegetable, bakery, confectionary products, cereal processing, packaging & bottling, food safety, etc. to meet the anticipated demand for qualified workforce and food engineers from fast-growing food processing industries in the region. The co-location of food processing training centre and food processing industries will create a synergy and sharing of knowledge.*
- ✓ ***Centre for Food Safety and Research:*** *It will also have a dedicated Centre for Food Safety and Research and Training in order to assist and advise food processing companies, to comply with the GMP and HACCP standards and producing safe foods. Food safety is an important issue for region due to outbreak of SARS, Avian influenza. The centre shall have facilities like quarantine, food testing labs, certification labs, basic food safety training.*
- ✓ ***Mekong Cultural Tourism Zone:*** *MIEC will support development of tourism zone in Mekong Delta with Can Tho as the gateway. The zone will have tourism facilities like museums, craft villages, local performances of folk artists, apart from hotels, guest houses, tourism facilitation centres, etc. to promote cultural viewing functions such as exploration of Mekong delta, cruises on Mekong.*

Dawei Growth Node (Myanmar): Dawei can be established as major economic centre for Myanmar and MIEC. Dawei has potential to emerge as centre for export oriented and forest-based industries. Port at Dawei has potential to become a gateway to MIEC region and a nodal point for exports to Indian, West Asian and European markets. Dawei will be developed as self-sustained node as it would be a Greenfield project and presently there is no other main economic or service centre in Myanmar side of MIEC region. The key initiatives proposed for this are given below:

Key Initiatives

- ✓ ***Deep Seaport:*** *The first priority in development of Dawei shall be construction of a Deep Sea Port*[43] *and developing of road connection to Bangkok*[44] *in order to boost trade between Mekong and India. The port with facilities such as crane, container yard, warehouse including cold storage and to expedite import/export transactions such as CIQS (Customs, Immigration, Quarantine, and Security) service and its consequent link to Bangkok is critical to development of this node.*
- ✓ ***Free Trade Zone/SEZ:*** *It is further proposed that an FTZ or SEZ be developed clustered with planned deep seaport. FTZ/SEZ will be a multi-industry zone offering facilities for international and regional distribution, manufacturing and products fabrication. It will mainly cater to export markets with focus on forest or wood-based industry, mechanical & electrical products, consumer goods, and other light*

[43] Note: Refer to Transport Linkages for detail discussions on Port (page 15)

[44] Note: Refer to Transport Linkages for details on Road Link (page 13)

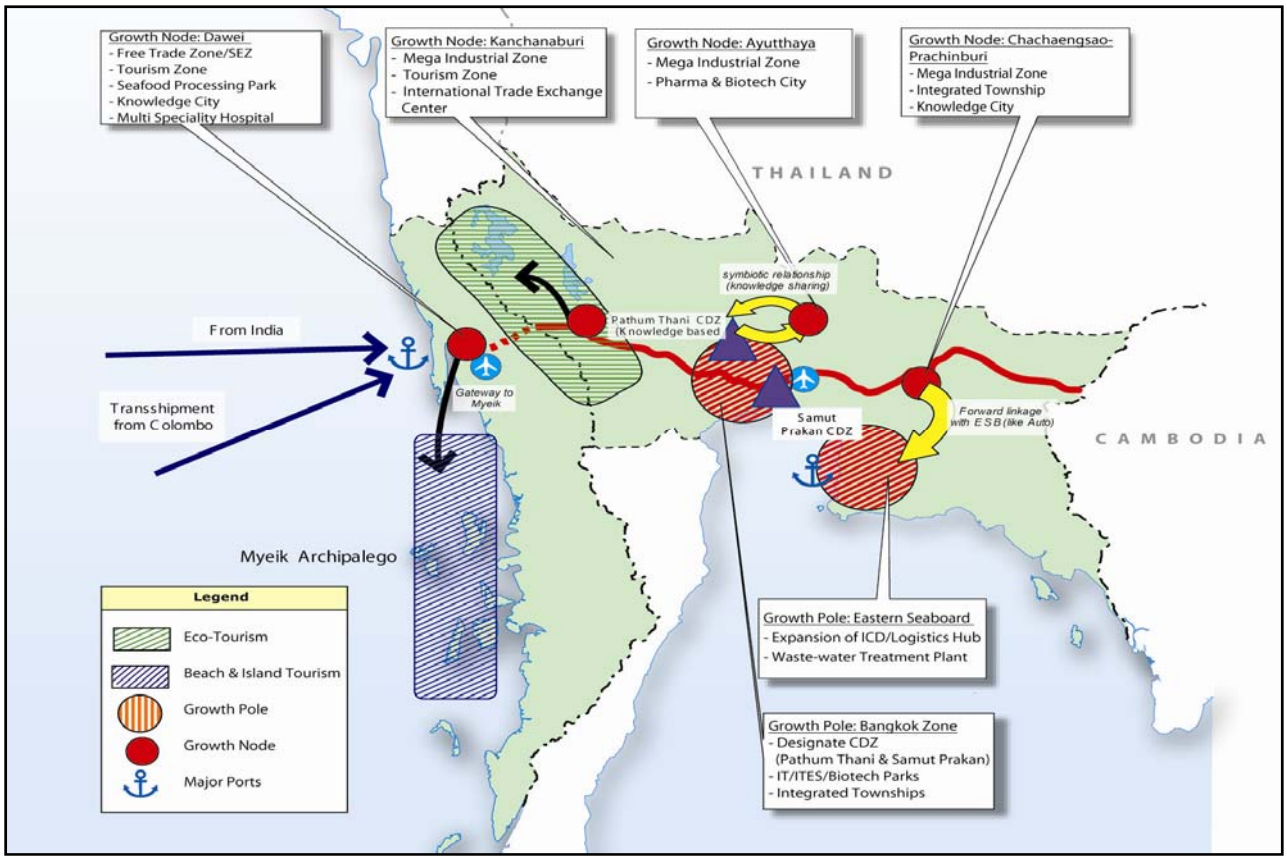
industries as the key industries. It will also have a Shipyard for repairing and building new ships. The zone will also house a Skill Development Centre providing training in industrial, mechanical, electrical engineering to meet up with skilled labour demand of industries.

- ✓ ***International Trade Exchange Centre:*** *With expected growth in the border trade between Myanmar and Thailand due to MIEC, a Trade Centre with facilities like Office Space, Product Display Centre, Warehousing facility, Customized Packaging and Repackaging facility, etc. shall be established at border at Bong Tee.*
- ✓ ***International Island Tourism Hub:*** *Dawei will become a hub for tourism focused on Myeik Archipelago in the Andaman Sea. Archipelago consists of more than 800 islands of varying size off the western shore of Taninthyari division. This has potential to be developed as major tourism hub like Phuket. Dawei can become a gateway to Myeik Archipelago and Thus a zone with Beach/Resort town, Tourist Facilitation Centre, Marina, Water Sports Complex and project of Water Front development shall be undertaken.*
- ✓ ***Upgradation of Dawei Airport***[45]*: In order to boost tourism in Myeik Archipelago, MIEC will support upgradation of existing airport at Dawei with connectivity to international destinations and all key airports in MIEC.*
- ✓ ***Seafood Processing Park:*** *Presently, Fisheries is the main economic activity of Dawei and Taninthayari division with high production of Seafood such as Jelly-fish, Lobsters, Prawns which can be exported. Thus this region can be developed as main centre of fish processing in Myanmar. MIEC shall support development of seafood processing park here. The proposed park will have seafood processing units as well as production units for ready-to-eat seafood products. It will have other supporting facilities like chill room, ice factory, data management and communication centre, and a Fisheries Training Centre for training fishing communities/fishermen and training for workers of processing units..*
- ✓ ***Rail and Road Links***[46]*: In order to integrate Dawei with corridor, MIEC will support construction of missing road and rail links from Dawei Port to Thai Border and subsequently to Bangkok. Initially the road link will be established and rail will be established after traffic reaches substantial volume.*

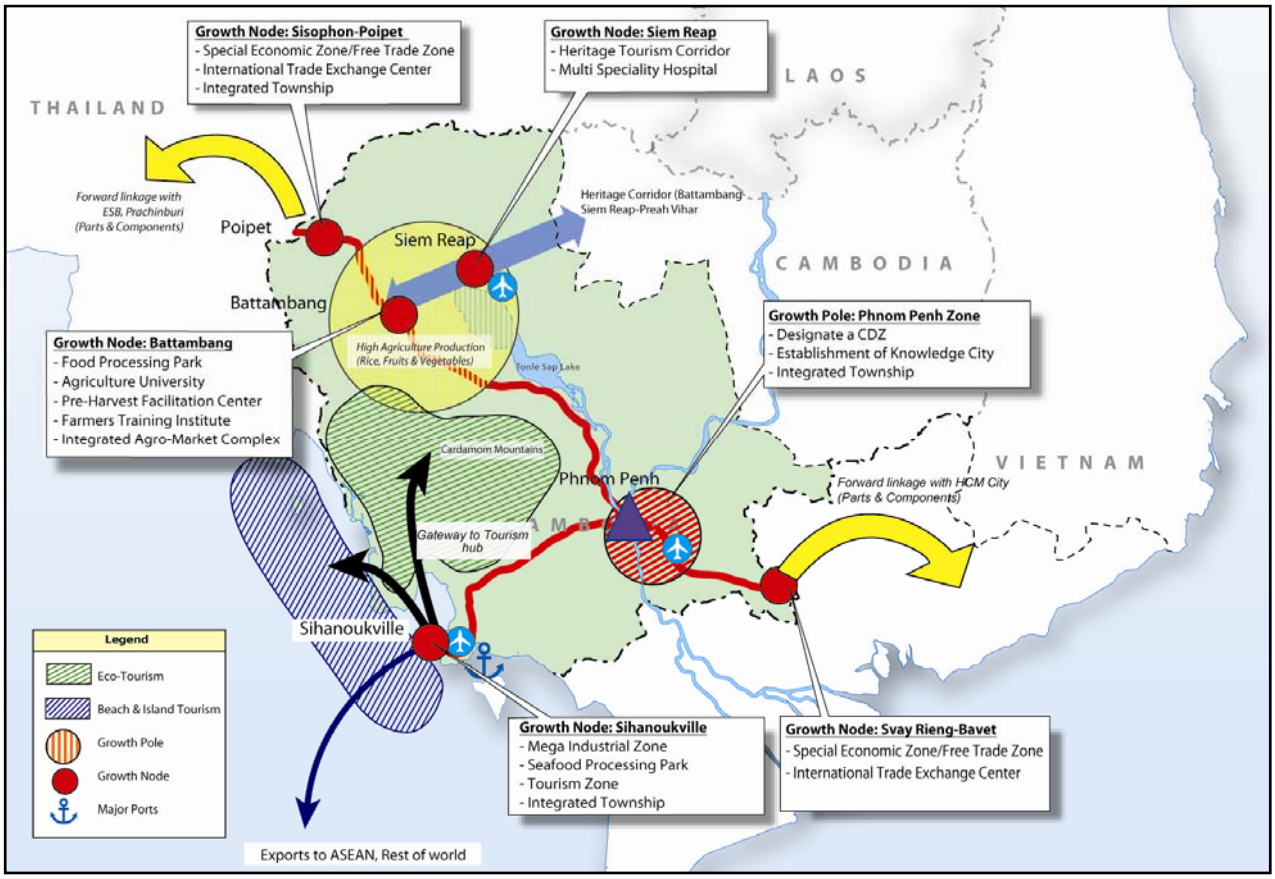
[45] Note: Refer to Transport Linkages for detail discussions on Airports (page 15)

[46] Note: Refer to Transport Linkages for detail discussions on Road and Rail (page 13)

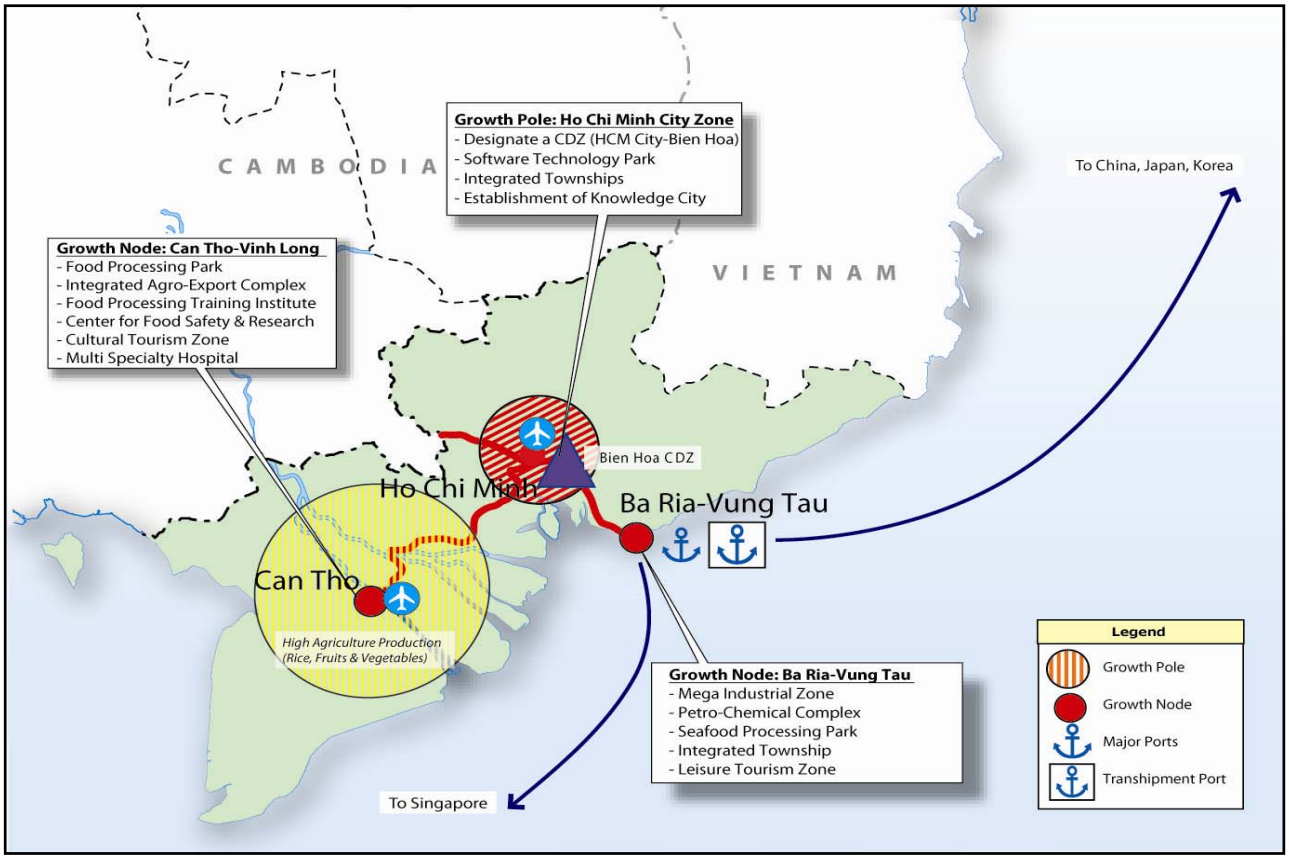
Map 7: Proposed Initiatives for MIEC (Myanmar – Thailand)



Map 8: Proposed Initiatives for MIEC (Cambodia)



Map 9: Proposed Initiatives for MIEC (Vietnam)



10. Proposed Projects for Key Transport Linkages

The projects for transport infrastructure are identified for all the modes of transportation viz. roads, rail, air, ports and logistics infrastructure based on the developmental strategies presented earlier.

10.1 Road Linkages

In order to provide better service levels in terms of higher speeds, savings in vehicle operating costs and travel time, a comprehensive road corridor improvement plan is being envisaged involving the following projects:

Table 4: Key Projects for Development/Improvement of Road Linkages

S. No.	Project Description	Length (Km)
1	**Corridor Upgradation**	
a	Upgradation (or new construction) of road link between Poipet and Bavet from 2-lane to 4-lane as access controlled expressway (Cambodia)	572
b	Upgradation of road link between Moc Bai and Vung Tau from 4-lane to 6-lane as access controlled expressway (Vietnam)	174
c	Upgradation of road link between Phnom Penh and Sihanoukville port from 2-lane to 4-lane as access controlled expressway (Cambodia)	226
2	**New Road Links**	
a	Construction of bypasses with access control around Phnom Penh City (Cambodia)	44
b	Construction of bypasses with access control around Ho Chi Minh City (Vietnam)	56
c	Development of road links from Dawei port to Bong Tee (Thailand border) and road from Bong Tee to Kanchanaburi in Thailand as 4-lane access controlled expressways	136
d	Construction of 4 lane access controlled expressway from Go Dau Ha to Vung Tau transshipment Port	163
3	**Development/Upgradation of Service Links from Growth Poles/Nodes**	
a	Upgradation of Road Link connecting Siem Reap with Battambang via Sisophon to 4-lane configuration (Cambodia)	85
b	Upgradation of road link between Can Tho and Ho Chi Minh City from 4-lane to 6-lane as access controlled expressway (Vietnam)	169
4	**Development of connectivity to Rural Areas**	
a	Upgradation of road between Chamkar Luang to Koh Kong from 2- lane to 4-lane as access controlled expressway	140
b	Development of important Rural Roads in Cambodia and Vietnam	4,000

Note: The entire corridor will also have user facilities consisting of petrol bunks, restaurants and rest rooms, truck parking and repairing facilities, etc. at every 50 km interval.

10.2 Railway Linkages

Given the low rail traffic volume at present, it is estimated that cross-border freight volume will not increase significantly in initial years of MIEC to make huge investments in development of multi country rail network. It is therefore proposed that upgrading the key domestic rail networks and enabling multi-modal transportation within the respective countries should be prioritized. In later phases, investments in rail network would be made to enable cross-border freight movement through integrated rail network.

The following projects are suggested for development/improvement for railway network:

Table 5: Key Projects for Development/Improvement of Railway Linkages

Strategy	Projects
Build or upgrade rail network at key high volume routes	Upgradation and double-tracking of Laem Chabang- Bangkok (ICD Lat Krabang) rail link[47]
	Construction of Ho Chi Minh City-Vung Tau (Cai Mep-Thi Vai Ports) rail link
	Rehabilitation of rail link from Sihanoukville Port to Phnom Penh (Cambodia)[48]
Establishment of continuous end-to-end rail links in MIEC supported by spur rail lines	Construction of missing link from Phnom Penh to Ho Chi Minh City
	Construction of missing link between Nam Tok (Thailand) and Dawei (Myanmar)
	Construction of missing link from Poipet to Sisophon (Cambodia)
	Rehabilitation of rail link from Sisphon to Phnom Penh (Cambodia)
	Establishment of rail transshipment terminal/yard as part of multi-modal logistics park at border crossings[49]
Upgradation of rail tracks to 20 tonne axle load	

10.3 Ports

The ports in MIEC will witness significant increase in traffic due to development of corridor and increased trade in MIEC with rest of the world. The upcoming/planned port capacities in MIEC region at present would not be able to cater to additional traffic demand generated from development of MIEC and most of the major ports would require capacity augmentation.

Particularly, in respect of India-Mekong trade, one of the anticipated benefits under the proposed port plan is that development of Dawei Port will reduce the travel distance and time for freight between India and Mekong. This will increase the competiveness of the products from Mekong countries and spur their trade with rest of the world.

Ports at Vung Tau and Dawei have potential to become the gateway ports for the region. With the development of these gateway ports, the international cargo from western part of world bound for MIEC

[47] Note: Under implementation and expected to be completed by 2010

[48] Note: Already under implementation under assistance from ADB and expected to be completed by 2010

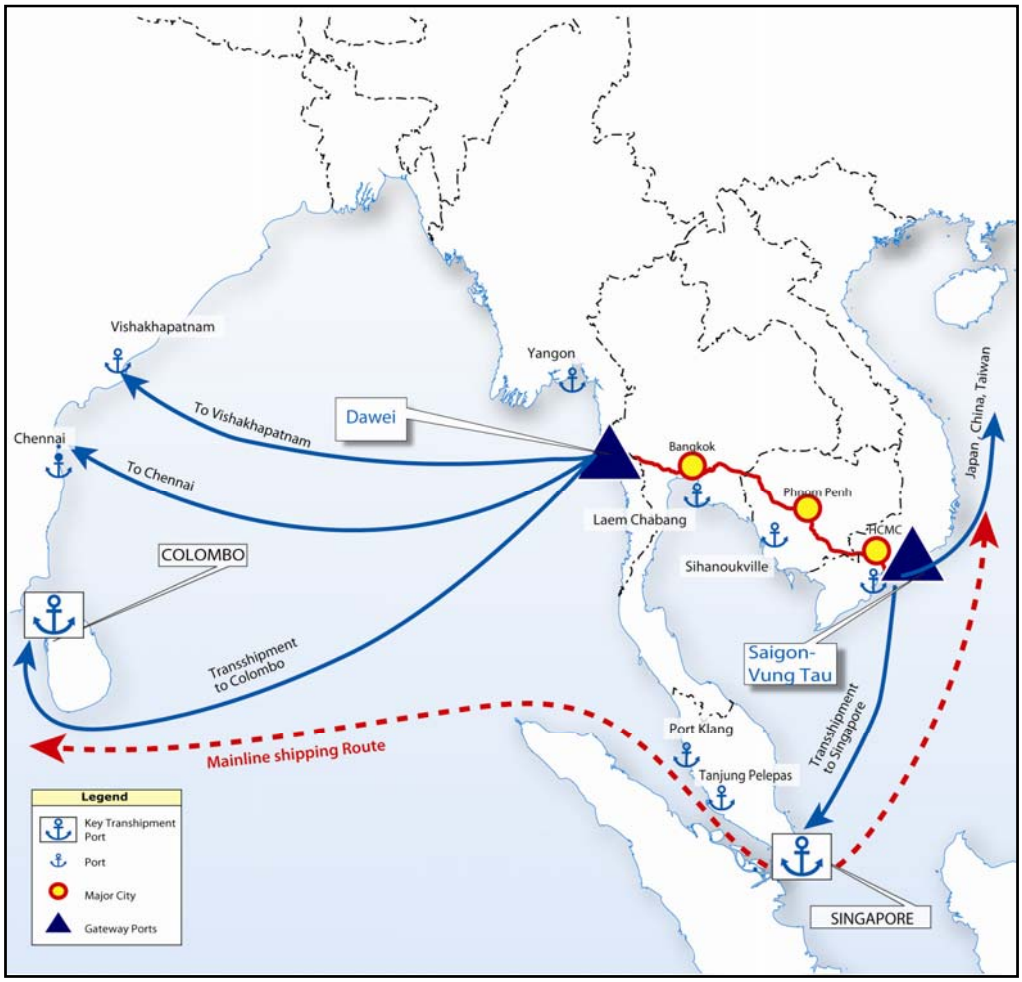
[49] Note: This yard will have rail-sidings, marshalling and shunting yard along with single 'Joint' customs-immigration-quarantine (CIQ) station wherein cargo and passenger can be transferred between countries

countries can be transshipped from Colombo, Vallarpadam or Vizhinjam to Dawei and cargo coming from east can be transshipped through Vung Tau. It is expected to bring in efficiency in sea transport because it would enable shipping lines to avoid heavily congested Malacca strait which also faces threat of piracy. It is therefore suggested that following projects be undertaken:

Table 6: Proposed Key Port Projects

Strategy	Project Description	Proposed Capacity (beyond 2015)
Expansion of ports capacity to meet the growing traffic demand	Expansion of Laem Chabang (Thailand)	1.5 million TEU
	Expansion of Sihanoukville (Cambodia)	0.3 million TEU
	Expansion of Cai Mep-Thi Vai Port (Vietnam)	6 million TEU
Development of ports to avoid congestion at Malacca Strait	Development of Greenfield port at Dawei (Myanmar)	1 million TEU
	Development of Transshipment Port at Vung Tau-Ba Ria province (Vietnam)	1 million TEU

Map 10: Sea ports in MIEC and Sea routes in South-East Asia Region



10.4 Airports

Air transportation infrastructure has recently been upgraded in Thailand, Cambodia, Vietnam and new plans have been prepared or under implementation to further improve the air infrastructure. The present projects and proposed expansion plans of existing airports by countries shall be adequate to meet both passenger and freight requirements of MIEC during the envisaged horizon period of this concept plan.

However, there is a need to upgrade some key airports in MIEC to boost the tourism potential of key tourism zone or nodes. There is also a need to focus of providing adequate infrastructure at airports to meet the growing demand for perishable cargo. Thus the following projects are proposed for airports in individual countries along with integration of existing plans as part of air transport strategy[50] for MIEC.

Table 7: Key Airport Projects for MIEC

Project Description	Status
Expansion of Suvarnabhumi Airport in Thailand	Already planned
Expansion of Siem Reap Airport in Cambodia	Already planned
Expansion of Phnom Penh Airport in Cambodia	Already planned
Construction of New Airport in HCM City in Vietnam	Under implementation
Upgradation/ Expansion of Can Tho Airport in Vietnam	Under implementation
Upgradation of Dawei Airport in Myanmar	Proposed under MIEC
Upgradation of Sihanoukville Airport in Cambodia	Proposed under MIEC
Upgradation of Dedicated Cargo facility for Perishable Cargo at Can Tho Airport in Vietnam	Proposed under MIEC

10.5 Multi-Modal Logistics Park

The Multi-Modal Logistics Parks (MMLPs) shall be developed in accordance with anticipated demand from key economic centres and development of other transportation particularly ports and rail. They constitute the landside infrastructure particularly impacting the efficiency of cargo movement through ports. Thus priority shall be given to MMLPs that cater to likely increased demand from port expansion and facilitate 'Just-in-Time 'inventory management in order to reduce cost of logistics. Key projects of Multi-modal parks suggested are:

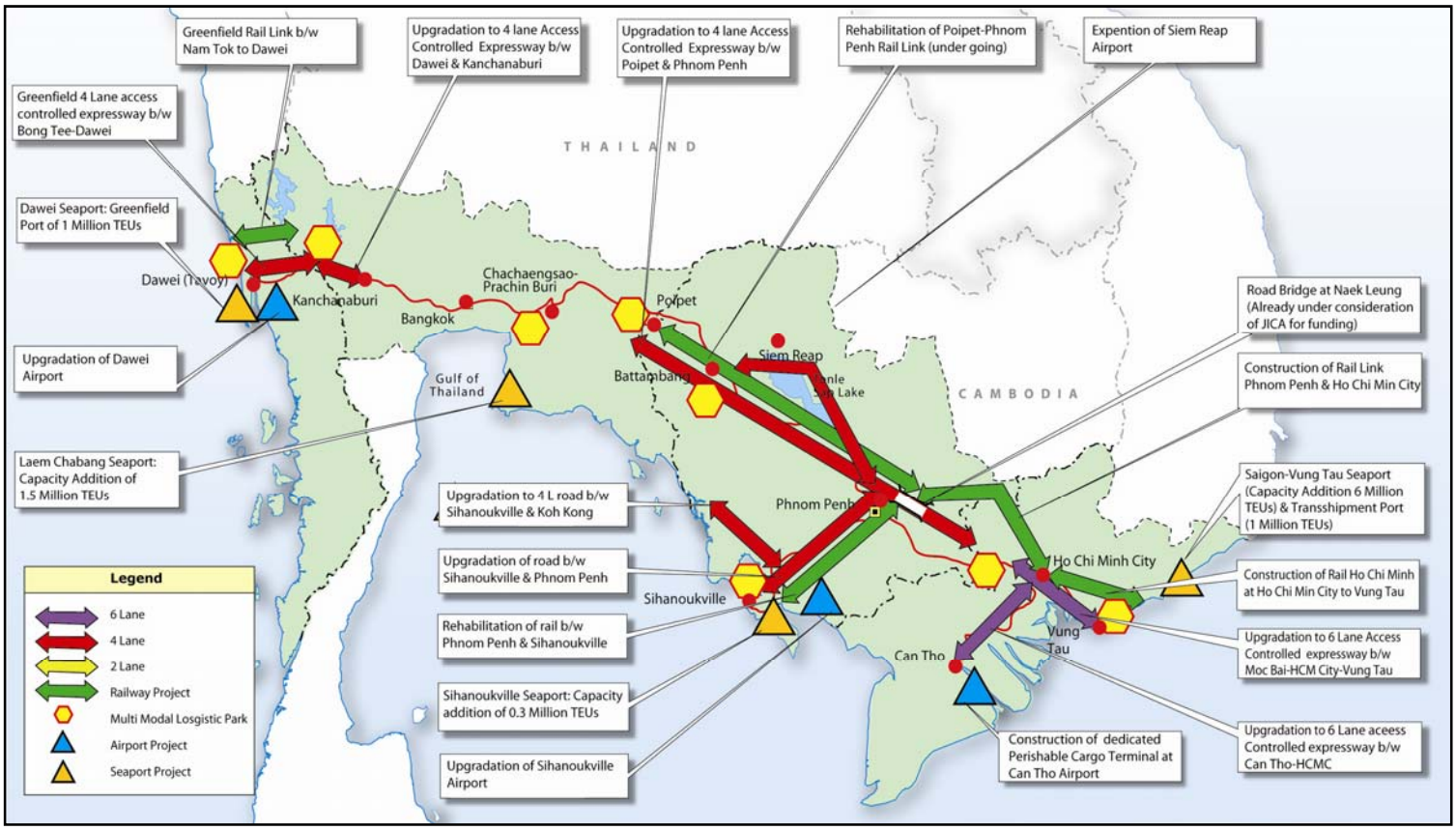
Table 8: Proposed Key Multi-Modal Logistics Parks at Key Locations

Location	Capacity	Components
Proposed Multi-modal Logistics Parks at Borders		
Aranyaprathet-Poipet (Thailand-Cambodia border)	0.5 Million TEUs	Interstate logistics complex, freight handling facilities, Rail Transshipment Yard, warehousing, container yard, CFS, truck parking, transfer facility, requisite equipments, etc.
Moc Bai - Bavet (Vietnam-Cambodia border)	0.3 Million TEUs	Interstate logistics complex, freight handling facilities, ware housing, container yard, CFS, truck parking, transfer facility, requisite equipments, etc.

[50] Note: For the purpose of this study, the detailed analysis and proposals on 'soft' aspects like air services, freedom rights, bilateral air service agreements, are not covered under the study.

Location	Capacity	Components
Bong Tee (Thailand-Myanmar border)	0.5 Million TEUs	Interstate logistics complex, freight handling facilities, ware housing, container yard, CFS, truck parking, transfer facility, requisite equipments, etc.
Proposed Multi-modal Logistics Parks at Ports		
Vung Tau - Ba Ria (Vietnam)	1 Million TEUs	New rail line between Ho Chi Minh City and Vung Tau with rail terminal, interstate logistics complex, freight handling facilities, ware housing, container yard, CFS, truck parking, transfer facility, requisite equipments, etc.
Sihanoukville (Cambodia)	0.4 Million TEUs	Nearby Sihanoukville port with rail terminal, interstate logistics complex, freight handling facilities, ware housing, container yard, CFS, truck parking, transfer facility, requisite equipments, etc.
Dawei (Myanmar)	0.65 Million TEUs	Nearby Dawei port with rail terminal, interstate logistics complex, freight handling facilities, ware housing, container yard, CFS, truck parking, transfer facility, requisite equipments, etc.
Proposed Multi-modal Logistics Parks at Growth Centres		
Prachinburi (Thailand)	0.5 Million TEUs	Logistics park, trade centre, warehousing (for finished products, inward raw material, incoming consumer goods), transport terminal, value-added services, requisite equipments, etc.
Battambang (Cambodia)	0.3 Million TEUs	ICD (dry port) cum logistics park, rail terminal, CFSs, container yard, truck park, customs bonded warehouse, requisite equipments, etc.

Map 11: Proposed Transportation Projects



11. Proposed Projects Regarding Support Infrastructure

11.1 Education and Skill Development

Based on the assessment of the educational requirements, a concept of developing Knowledge City[51] has been suggested for each country. The components of Knowledge City presented below for each country would differ according to the existing education setting and potential benefits that the country can realize from developing these education facilities. The details of projects for each country are given below:

- ***Knowledge City at Chachoengsao in Thailand:*** In order to support industries in Eastern Seaboard, Chachoengsao-Prachinburi region and proximity to large pool of population of north-east provinces, a Knowledge City is proposed to be located in Chachoengsao. It shall have Engineering Colleges, Vocational Training Institutes, Skill Upgradation Centres, etc. in collaboration with industries to maximize academia-industry interaction. These would focus on highly specialized and technical courses like precision mechanics, electronics application, software engineering, advance computing, apart from basic engineering courses.
- ***Knowledge City at Phnom Penh in Cambodia:*** To support the industries and service sector, a Knowledge City is proposed to be set up as part of Phnom Penh Comprehensive Development Zone as Phnom Penh and Kandal provinces have high population and higher educational levels. This city is planned to be the hub for higher education in Cambodia and will focus on (i) technical and vocational training; and (ii) service-based skill development. It shall have Engineering Colleges, Skill Upgradation Centres, Vocational Training Institutes, IT School, Hotel Management Institute, Management School, and a University with variety of courses focusing on service and manufacturing industry. The location of knowledge city in this zone shall provide access to higher education to vast young population and realize its 'demographic dividend'.
- ***Knowledge City at Ho Chi Minh Zone in Vietnam:*** A Knowledge City is proposed to be set up as part of HCM City Comprehensive Development Zone in order to support emerging ICT industry. The knowledge city will have facilities to provide education on basic engineering courses such as industrial, mechanical, electrical, automotive, marine, chemical and dedicated institutions for IT/Software and multi-media applications. Being located in HCM City Zone, it will have an advantage of proximity to huge talent pool and industry-academia interactions.
- ***Knowledge City at Dawei in Myanmar:*** A Knowledge City is proposed to be set up in Dawei to support the industrial, trading and other services proposed there as well as meeting the educational needs of existing population. The Knowledge City would primarily comprise of Skill Upgradation Centres, Polytechnics and Engineering Colleges, focusing on imparting skills for manufacturing industry. The courses to be introduced would be basic engineering courses and vocational skills with the purpose of preparing the students for jobs in industries. It would also host IT School, Hotel Management Institute, Management School, and University with variety of courses for training the students for the service industry such as tourism/hotel, accounting and trade services, health and nursing, among others.

[51] Note: Knowledge city is envisioned as a community of institutions that serve the diverse range of educational needs from early childhood education to post-graduate study. It will provide land or built-up spaces for multiple educational institutes, business schools, academic services and support providers, professional training centres, research institutions and shall also house facilities for students including hostels, health and sports, medical and hospitality. It will also have requisite residential, commercial and recreational facilities to meet needs of student, teacher. The knowledge city is akin to educational cluster or university campuses like Oxford, Cambridge, and National University of Singapore. Unlike these, knowledge cities are specially planned, with all requisite facilities. Key examples of such knowledge city are Dubai Knowledge Village, Qatar Education City near Doha, King Abdullah University of Science & Technology at Jeddah.

11.2 Health

Based on the assessment of healthcare needs and disease profile of countries in the corridor, following projects have been suggested for developing human resources development in each of the countries:

- ***Multi-Specialty Hospital and Medical Education City in Dawei (Myanmar), Siem Reap (Cambodia) and Can Tho (Vietnam):*** The overall condition in terms of healthcare facilities and infrastructure in Myanmar, Cambodia, and Vietnam (particularly Mekong River Delta region) is not adequate to meet the health care needs of existing population. Moreover, there is an acute shortage of skilled medical staff like doctors, nurses, physician, etc. Hence a multi-super specialty hospital and medical education city with 1,000 bed capacity is proposed at Dawei, Siem Reap and Can Tho.
- ***Integrated Mother and Child Care Centre and Training Institutes in Dawei (Myanmar) and Battambang, Phnom Penh and Kandal Provinces (Cambodia):*** Battambang, Phnom Penh and Kandal Provinces in Cambodia and Taninthyari in Myanmar[52] have very high maternal and infant mortality rates. Moreover, there is a high unmet demand for specialized hospitals and skilled manpower and low rates of delivery by skilled personnel. Hence, Integrated Mother and Child Care Centre and Training Institutes are proposed at Battambang, Kandal Province in Cambodia and Dawei in Myanmar. The institute would impart training to local health resource persons e.g. health workers, birth attendants, nurses and midwives for ante-natal and post-natal care, and care of children mainly to prevent disease and malnutrition.
- ***Advanced Cancer Diagnostic and Treatment Centre at* Ho Chi Min City *(Vietnam):*** Vietnam has high incidence of mortality caused by the non-communicable disease and cancer is among the prominent disease. It meets just 10% of demand for cancer prevention and needs international support[53] in terms of cancer diagnosis, treatment, palliation and rehabilitation facilities.
- ***Regional Eye Care and Post-Graduate Research Centre* at Ho Chi Min City (Vietnam)**: There is a lack of healthcare infrastructure in Vietnam to address eye related problems such as refractive error in schoolchildren, trachoma and general lack of awareness of eye care in the community. The dearth of eye care services, infrastructure and human resource capacity in Vietnam is a significant barrier to basic human development. The regional eye care centre would provide professional support to Optometry Technicians and Optometrists, and also assist in the creation of regional eye care resource centre.
- ***Rehabilitative and Occupational Therapy Centre at Battambang (Cambodia):*** Landmines result in significant injuries throughout Cambodia with Battambang continues to be the most heavily mined province in Cambodia[54]. The country needs continued support for developing system for rehabilitation service delivery. Hence, a Rehabilitative and Occupational Therapy Centre is proposed at Battambang Province in Cambodia to provide prosthetics, crutches, wheelchairs, while assisting the affected patients in leading a normal life through rehabilitative therapy. The proposed centre would treat the victims of landmines and rehabilitate them by providing vocational training for jobs or self-employment.

11.3 Power

The power projects have been proposed to be developed in phased manner depending on the demand particularly from key economic centres of Growth Node/Poles. Priority shall be given to those projects which cater to electricity needs of critically deficient areas and new industrial projects planned. Following projects have been identified for MIEC:

[52] Note: Provincial data for Myanmar is not available.

[53] IAEA, 2007

[54] Lutheran World Federation, 2009

- ***500 MW Sihanoukville Coal-fired Power Plant, Cambodia:*** This thermal plant is proposed to be located in Sihanoukville province in the vicinity of 200 MW plant which is already awarded to Power Synergy Corporation. The proposed power plant can be fed to the double circuit 230 kV Sihanoukville – Kompot Transmission Line (Funded by ADB and JBIC) through Sihanoukville substation. The fuel for this project can be sourced from coal reserves in Cambodia and supplemented with imported coal through Sihanoukville port.
- ***1200 MW Soc Trang I Gas Power Plant, Vietnam:*** The project will be located in Soc Trang province in Vietnam. The project can be developed with combined cycle technology. The plant will be connected to the National Grid through existing 200 kV transmission line.
- ***2 x 1000 MW Nuclear Power Plant, Vietnam:*** A nuclear power plant can also be established to meet power demands of Vietnam and MIEC corridor. The project can be located in Ninh Thuan which has already been identified by Vietnamese government as potential location for nuclear power plant. The power plant can be developed either with Pressure Water Reactor (PWR) Technology or Boiler Water Reactor (BWR) Technology. This plant will be connected to the southern part of Vietnam through Tan Dinh substation, near Ho Chi Minh City.
- ***100 MW Hydro Power Plant, Vietnam:*** Lam Dong province of Vietnam has huge potential to generate hydro power which can be supplied to MIEC region.
- ***4 x 600 MW Son My Thermal Power Plant (Unit 1 – 4), Vietnam:*** It is suggested to take initiative in developing the Son My coal fired power plant at Binh Thuan Province to compensate the short fall of power in the corridor region. The first two units shall be taken up on priority to compensate the short fall of power in the corridor region.
- ***600 MW Hydro Power Project, Myanmar:*** This project will be developed on Tanintharyi River in Myanmar. Thailand can invest in this project and electricity generated from this project will be transmitted to Thailand. Some percentage of electricity can also be distributed to compensate the local demand of lower part of Tanintharyi division.
- ***600 MW and 700 MW Thermal Power Plants in Cambodia and Myanmar respectively:*** These gas fired projects can be developed at Koh Kong or Sihanoukville province and Taninthayari division of Myanmar. Fuel for power plant in Cambodia can be supplied from Block A of Khmer Basin in Gulf of Thailand and for Myanmar plant can be supplied from either Yadana or from new M9 Block near Yadana.
- ***Transmission Lines in Myanmar, Thailand and Vietnam*:**
  - *Double Circuit 230 kV Kanchanaburi-Dawei Transmission Line between Myanmar and Thailand:* This Transmission Line would be developed simultaneously with the proposed hydro power plant near Dawei. This 230 kV double circuit transmission line will help to transmit electricity from Myanmar to Thailand.
  - *500 kV Transmission Line in Vietnam:* 500 kV Can Tho – Ho Chi Minh City Transmission Line will help to supply electricity generated from O Mon Power Complex to consumption in South Vietnam.
  - *200 kV Transmission Line in Vietnam:* A 230 kV Phnom Penh – Takeo – Vietnam Transmission Line (project funded by ADB and NFD) will connect Cambodia with Vietnam in Chau Doc, Vietnam. This line is being developed to transmit electricity to Cambodia. Chau Doc needs to be connected to the National Grid. 200 kV Chau Doc – Can Tho Transmission Line will help to complete this line.
  - *Double Circuit 230 kV Phetchaburi Transmission Line between Myanmar and Thailand:* This 230 kV transmission line will evacuate power from proposed hydro power plant in Myanmar. This Transmission Line can be connected to 230 kV substation of Phetchaburi of Thailand.
  - *Up-gradation of 115 kV Thailand – Bantey Meanchey – Siem Reap – Battambang transmission line from single circuit to double circuit:* As the corridor develops and demand for electricity increases, there would be a need to upgrade transmission network to key economic centres in Cambodia. Thus new Thailand – Bantey Meanchey – Siem Reap – Battambang transmission line shall be upgraded to double circuit.

Apart from above-mentioned projects, MIEC will promote renewable energy in corridor. In order to demonstrate the possibility of renewable energy, following projects[55] can be developed as pilot projects to promote renewable/alternative energy in MIEC region:

- **300 kW PV Solar Power Plant at Svay Rieng, Cambodia:** According to a study conducted by New Energy and Industrial Technology Development Organization (NEDO), all of Cambodia has "extremely good potential" for photovoltaic power generation[56]. Within Cambodia, Svay Rieng province has the highest average daily insolation of 5.1 KWh/m²/day, which makes it a suitable location for Solar Power Plant[57].
- **600 kW Bio-mass Power Plant at Battambang, Cambodia:** Battambang has high potential for biomass based power plant. It produces around 6 million cubic meters of fuel-wood annually, which theoretically can produce about 600 MW of power[58]. Battambang is presently hub of agriculture production of crops such as rice, sugar cane, maize. With Battambang being developed as *'Agri-hub'*, the residue is likely to increase further. Thus sufficient quantities of crop residues is expected to be available in Battambang and be used as fuel for power generation.
- **3 MW Wind Power Project at Binh Thuan, Vietnam:** Southern & Central Vietnam has good potential for generating wind power with average wind speeds of 4-7 m/s in many coastal areas[59]. Many investors also expressed their interest in building wind power plants in Vietnam, especially in Binh Dinh, Ninh Thuan and Binh Thuan. Thus a wind power project can be developed in Binh Thuan province.

12. Projects Identified in Corridor

Various projects have been identified from the initiatives presented earlier under each of the Growth Poles and Growth Nodes. Such projects are termed as **"Potential Projects".** The list of projects presented under various categories in Annexure 2 is an exhaustive list and prepared in accordance with the existing and proposed development plans by member countries in the corridor region and plans of various multilateral agencies like ADB, JICA, etc. for the region as a whole.

The immediate need of MIEC region is the development of transportation infrastructure in order to achieve economic integration and act as catalyst for developing Growth Nodes and Growth Poles MIEC and trigger the development in MIEC. Thus out of the list of potential projects, a few projects pertaining to the development of transportation infrastructure in the region especially roads, ports, logistics and cross border infrastructure have been prioritized for immediate development. Such projects are termed as **"Priority Projects"**. The detailed list of priority and key projects is presented in Annexure 2. Some of these projects are planned to be undertaken on PPP basis and a few model projects are identified on PPP for immediate implementation. The potential projects for PPP is further assessed qualitatively based the projects' propensity to attract private investments, current economic conditions, legal and regulatory environment of the countries, ongoing global financial crisis, among others. These are also presented in Annexure 2.

[55] Note: These are indicative location and size of the projects. The detailed feasibility & project report will need to be prepared to identify the site and size of the projects.

[56] Cambodia Renewable Energy and Rural Electrification, 2007

[57] NEDO, 2008

[58] World Bank, 2006

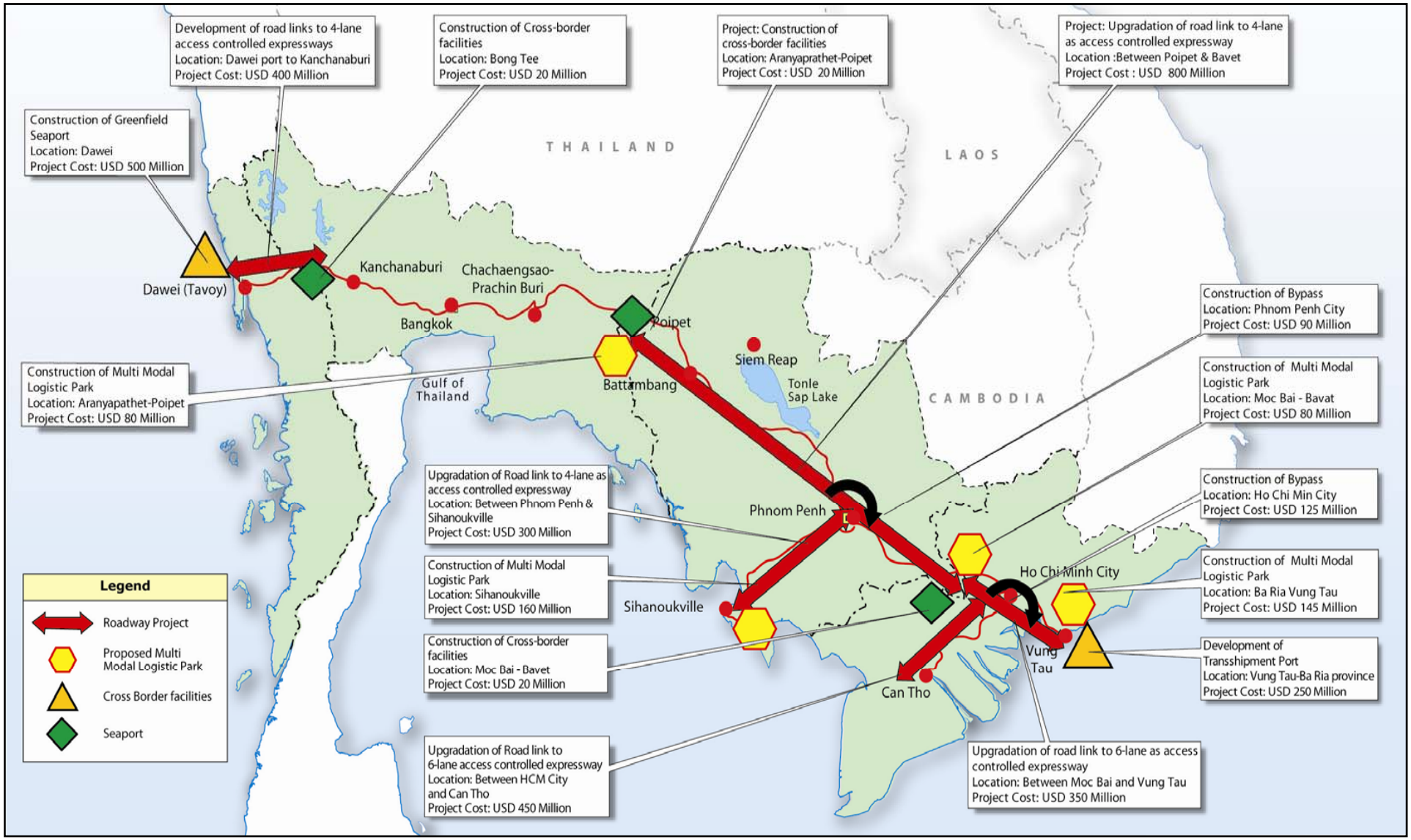
[59] Institute of Energy, Vietnam

Table 9: Categorization of Projects Identified for Development in MIEC

Category	Definition
Priority Projects	Immediate implementation to address the critically deficient need of improving the backbone transportation infrastructure in the corridor region, creating platform for transformation of MIEC and to promote PPP in the corridor region
Key Projects	New corridor strategic projects as well as capacity enhancement projects implementation timing of which would primarily be policy and demand dependent

The location of proposed priority projects is presented in Map 12.

Map 12: Proposed Priority Projects



13. Impact of Corridor

The MIEC Corridor would witness significantly large investments in infrastructure and industries facilitated by excellent trade linkages and advent of new industrial sector, high levels of economic activities, growing urbanization, increase in employment and overall economic development of countries. The MIEC corridor would have a huge impact on each of the MIEC economies and for the overall Mekong region and it is important to measure the effect of such activity on the economy in order to decipher the actual benefit. For this purpose two separate models have been adopted for identifying the impact on GDP, employment and trade (exports). The first model, a standard OLS regression, gives the impact on GDP and Employment, while the second model, the Gravity Model gives the impact on Trade (Exports) of MIEC countries.

13.1 Impact on GDP and Employment

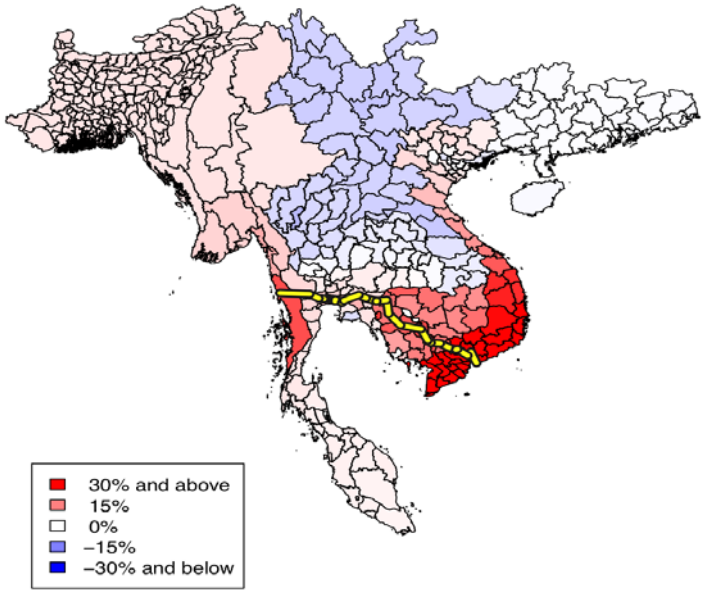
MIEC is expected to connect the countries more tightly and promote economic integration in the region. Analysis using the IDE/ERIA Geographical Simulation Model[60] (IDE/ERIA-GSM) shows the relation between economic integration and its impact on economic growth at sub-national level. Analysis using the IDE/ERIA-GSM provides two sorts of important information. The first is the influence of particular regional level infrastructure on the location of population and industries in East Asia in a long run. The second is the impact of regional infrastructure projects on the sub-national level economic development.

The Analysis based on IDE/ERIA-GSM shows the top beneficiaries regarding GDP are Ca Mau, Soc Trang and Bac Lieu of Vietnam whereas other regions such as Southern Vietnam, Cambodia, some regions in Thailand such as Chachoengsao and Ayutthaya and some regions of Myanmar such as Taninthyari will receive relatively large positive impact. The result of the analysis shows that only construction of transportation facility with sufficient border process improvement under MIEC may increase national GDP of Cambodia, Vietnam, Myanmar and Thailand by 17.6%, 37.8%, 4.8% and 1.9% respectively. It is expected that additional projects will add further increase of GDP of the region.

It has to be noted that other regions (West India, Bangladesh and the Malay Peninsula) benefit from MIEC as well. This is because the MIEC reduces transport costs across all regions by going through four countries located in the centre of Continental South East Asia. However, it has to be noted that simple construction of transportation infrastructure might decrease the relative competitiveness of rural provinces which are distant from the corridor. This indicates that the development of MIEC needs a holistic development approach and accompanied by measures for rural development, congestion mitigation in Bangkok Metropolitan area and other corridor developments such as East-West Economic Corridor.

[60] Note: The Geographical Simulation Model (GSM) aims to focus on the geographical structure of the regional economy, mainly from the viewpoint of spatial economics. It focuses on the relationship between economic integration and regional economy at sub-national level. The GSM is designed to predict the effects of the regional economic integration, especially the development of transport infrastructure and reduction in “border costs”, and fits very well in the ERIA infrastructure project.

Figure 2: Impact of MIEC on Mekong/Malay Regional Economy



13.2 Impact on Trade

Properly estimated trade potentials help support the countries to take necessary policy measures – either to retool the export-led globalization process or to build/plan infrastructure (national and/or international) to support the country's (or a region's) growth and trade or the combination of both. The future trade potential (change in volume of exports) in MIEC has been estimated.

In case of Cambodia, the additional exports generated due to MIEC are estimated at USD 20 Billion and for Vietnam, the incremental exports would be around USD 132 Billion. Thailand, however would have the largest impact due to MIEC Corridor, the total incremental exports for Thailand as a result of MIEC would be around USD 292 Billion.

Table 10: Impact on Trade

Country	Incremental Exports (USD Billion) with MIEC
Cambodia	20.42
Vietnam	132.60
Thailand	292.62

14. Financing Mechanism for MIEC

MIEC would involve development of various infrastructure projects across sectors and countries through various suggested implementation structures. The funding for the proposed development is envisaged to come from government sources, multilateral agencies and private sector. Overall it is estimated that implementation of projects in MIEC region would require an investment of USD 88 Billion. The various project categories identified as part of corridor concept are presented below:

- Priority projects critical to create backbone transportation infrastructure
  - Road infrastructure projects
  - Logistics infrastructure

- Ports

- Key Projects

  - Road projects requiring capacity augmentation and to be developed as service links
  - Augmentation of rail linkages and development of connectivity to the identified investment regions/ industrial areas
  - Power plants
  - Knowledge city, education/skill development infrastructure
  - Provision/ augmentation of Health infrastructure
  - Special Economic Zones, Industrial Parks
  - Integrated Townships
  - Provision of requisite urban infrastructure
  - Augmentation of industrial areas etc.

The horizon for the development of various identified projects in corridor is considered as 10 years. The projects as envisaged under the larger framework of MIEC can be categorized mainly in four categories as:

i) **Large Capital – High Return** (capital intensive in nature, requiring large upfront investments for the initial period, but have high financial returns over a longer period of time),

ii) **Large Capital – Low Return** (involve huge capital investments but have lower returns, or the returns to be realized by the investor would be spread over longer time horizon),

iii) **Moderate Capital – High Return** (projects that have low capital investments and high profitability for the investor over a comparatively shorter periods of time) and

iv) **Moderate Capital – Low Return** (less capital intensive and also have lower returns on the investments viz. social projects).

Based upon the scale of capital involved and anticipated risk in the returns for various projects, the financial contribution of the identified stakeholders under each identified infrastructure project would vary significantly which may be depicted as follows:

Table 11: Classification of Projects based on Capital-Return Relationship

Stakeholders	Large Capital-High Return	Large Capital-Low Return	Moderate Capital-High Return	Moderate Capital-Low Return
1. Respective National Governments (Public Sector)	√	√		√
2. Multilateral Donor Agencies	√	√	√	√
3. Private Sector				
• PE Investors/Financial Inst./Investment Banks			√	√
• Private industrial groups/Corporate houses	√		√	

Due to current financial crisis, it may be difficult to source funding from the private sector for envisaged infrastructure projects in the initial phase of the project. This is primarily due to premature markets in the region, reduced risk taking capacity of private entrepreneurs for infrastructure projects, and lack of

market conviction on MIEC development. Hence, it would be imperative for the governments to take up the responsibility of funding the most of the major projects either through entire public funds (budgetary/multilateral assistance) or viability gap funding (which could either come from budgetary or multilateral sources as soft loans) in the initial periods, to instill the confidence in the private sector to participate in infrastructure development in long term horizon. Gradually, with financial environment improving, the projects (including existing projects) can be sold to private sector or riskier forms be employed.

There are some critical projects such as development of integrated cross-border check points, road projects in Cambodia and Myanmar, development of Dawei deep seaport, etc. which are not commercially viable at present due to nature of projects in terms of risk-return relationship, capital requirement, credit worthiness of some countries in corridor, etc. are proposed to be developed on priority through public finance to support the overall objective of MIEC integration. However, there is also a requirement of involving private sector in infrastructure development not only in terms of attracting funds (from private sector) but also in O&M of projects to bring private sector service delivery quality and efficiency. Therefore, in order to trigger the development of projects in corridor, a few projects based on qualitative risk-return basis, legal framework and history of private sector involvement in infrastructure development in countries in corridor, have been identified to be developed through private sector participation/public private partnership.

The funding sources for the projects shall be in terms of budgetary/extra budgetary, grants, soft loans, official development assistance (ODA), funds from capital markets, etc., from various category of stakeholders (governments of partnering countries, governments of other countries in the region, multi-lateral organizations and private investors, both domestic and international). The private sector funding shall mainly be divided following broad categories:

1) Financial Institutions/ Investment Banks including insurance companies, pension funds, mutual funds etc.

2) Private industrial groups with infrastructure development as core business activity / Corporate Houses who may be interested in funding project development activities with the objective of expansion of their business.

3) Apart from the above, Private Equity investors may also be interested in providing the equity capital to fund (PE Funds) the projects. Such dedicated PE fund(s) can be promoted for investment in MIEC region with focus on various infrastructure sectors with diverse group of investors.

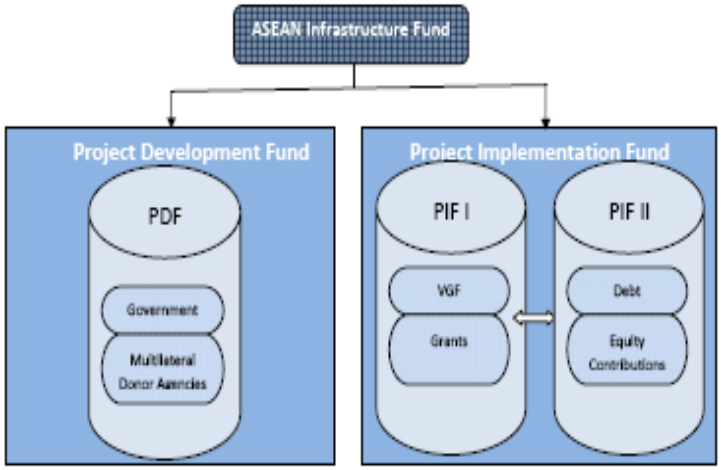
In current financial crises, generating financial resources by issuing bonds may also be considered. It is envisaged that the respective countries would also create dedicated pool of financial resources to implement the projects in MIEC region. Based on preliminary assessment carried out for investments on implementation of these infrastructure projects, it is estimated that about USD 5.4 Billion would be required for implementation and about USD 0.08 Billion would be required to fund the project development activities of these projects. The broad distribution of sources of funding is as under:

Table 12: Sources of Funding

Description	VGF/Public Investment	Soft Loan	Equity	Total
Investment (USD Million)	2,965-3,234	1,078-1,348	809-1,078	**5,390**
Percentage Contribution	55-60	20-25	15-20	**100**

As the development of projects in MIEC is proposed both on public finance and private sector funding, creation of an infrastructure fund is suggested which would provide funds for planning, development and implementation of various identified projects.

14.1 ASEAN Infrastructure Fund (AIF)



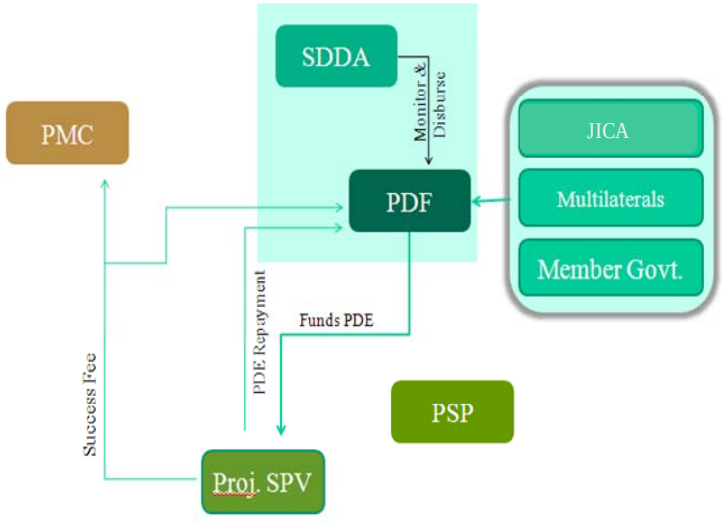
To cater to MIEC project requirement of USD 88 Billion, it would be required to implement projects under various phases, through Public Private Partnership (PPP) and through public sources. AIF can be raised through a combination of debt and equity involving various stakeholders as principal contributors explained above. AIF shall be utilized to develop projects targeted towards both PPP and exclusively Public funded projects based upon the associated risks- returns and would comprise of following two segments.

The creation of an infrastructure fund for ASEAN countries is proposed to provide necessary funds for project preparatory and implementation activities for ASEAN countries including countries in MIEC. The objective to develop the infrastructure fund at ASEAN level is to cater to development of potential infrastructure linkages between MIEC and other non-MIEC ASEAN countries.

The project implementation mechanism shall have two major components:

I. **Project Development Fund (PDF)**: To be utilized for projects to be developed on PPP
II. **Project Implementation Fund (PIF)**: To be utilized for financing implementation of projects

I. Project Development Fund (PDF)



The PDF is proposed to be created as a revolving fund for funding the project development activities including the costs of engaging planning/engineering consultants and transaction advisors. This fund is also suggested to finance the additional activities such as *land acquisition, removing encumbrances, getting environment clearances, initial equity participation in SPVs*[61]*, capacity building, etc.* The fund shall receive budgetary provisions/ grants from governments of each of the partnering country and be further supplemented by ODA, bonds and contribution from multi-lateral agencies like ADB, JICA, etc. (see figure above) in the form of both grant and soft loans based upon agreed interest rate for specific period.

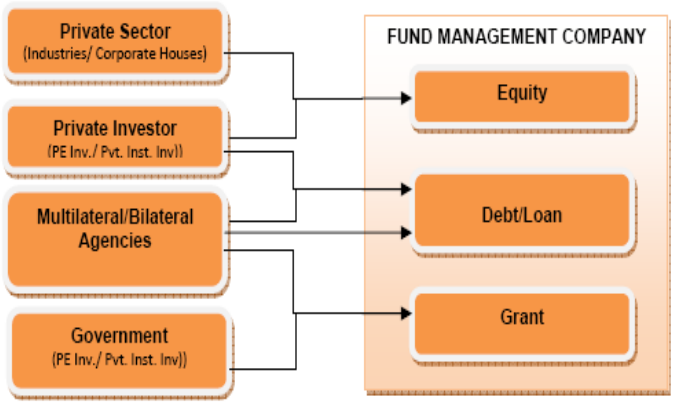
It is estimated that total funding requirement in PDF would be about USD 1.5-2.0 Billion. However it is proposed that PDF would have an initial corpus of USD 100 Million to finance the project development

[61] Note: Special Purpose Vehicles could be (i) entirely private sector entities, (ii) entities with joint-venture between public and private, or (iii) purely public sector entities, depending upon the type of projects being implemented.

activities of the prioritized projects. The PDF would be housed in and managed by a Single Dedicated Development Agency (SDDA)[62], discussed in detail in a later section) and would be disbursed with the assistance of PMC(s)[63]. The PMC(s) shall also assist SDDA in technical and financial structuring of the projects. On successful technical closure of the projects, PDF so utilized towards project development activities, shall subsequently be recovered from the Private Sector Participant (PSP or developer). In addition to PDF recovery, success fee would also be payable by PSP, which shall be apportioned between PMC(s) and PDF based upon predefined agreed terms and conditions.

II. Project Implementation Fund (PIF)

A PIF is proposed to be established as a legal entity with its own charter for investment in infrastructure projects in MIEC region. This fund is targeted to finance the implementation of the projects through capital grants and viability gap funding from government and multilateral agencies, debt/loans from private sector institutions (like investment banks, international development agencies, multilateral agencies, etc.), and equity from private equity investors.



It is envisaged that a dedicated **Fund Management Company (FMC)** be created to manage the PIF. This company shall work under the directions of the Project Implementation Fund Committee (PIFC), an apex body with representation from SDDA, fund contributors such as respective government representatives, multilateral and bilateral agencies and private sector investors. The PMC(s) would assist SDDA in identifying the projects and present to PIFC, which shall appraise the projects with assistance from FMC to decide upon the funding structure of the given projects.

14.2 Role of Fund Management Company

The fund management company shall work as extended arm of PIFC with primary functions as under:

- Assist the PIF in establishment of Viability Gap Funding (VGF)[64] with contributions from respective governments and agencies
- Facilitate the ceation of debt fund by carrying out the fund syndication through debt from developmnet agencies and private sector financial institutions
- FMC shall be responsible for fund raisisng and asset management for establishing a PE Fund with a mandate to invest in infrastructure projects in MIEC
- Assisting PIFC in appraising investment in projects developed by SDDA.

[62] Note: SDDA would essentially be a multi-faceted organization responsible for planning, coordination, and implementation of suggested action plans/projects (including associated managerial support and funding) and other activities related to development of corridor. It would take the 'ownership' of program and work independently from development agenda of governments in corridor.

[63] Note: PMC shall be a consultant who as program manager shall work under the aegis of SDDA to provide necessary advisory assistance with respect to the project preparation, development, financing and implementation.

[64] Note: VGF is a mechanism under which a lumpsum payment by Government is made to support PPP projects which eventually enhances the commercial viability of the projects. An infrastructure project may not be commercially viable for private sector to invest but have high economic benefit. In order to promote development of such projects through private sector particiaption, a financial support is generally given in form of grants (as percentage of total project cost). This reduces the capital cost for private sector thus making the project more attractive.

14.3 Credit Enhancement

It is envisaged that some of countries in MIEC corridor viz. Cambodia, Myanmar may have problems related to borrowing capacity. While the essence of corridor creation is to build infrastructure sustainability across region (cross country), it may be difficult for such countries to provide guarantees to raise substantial debt. Thus credit enhancement mechanism will be established to fund the projects which are either cross country projects in corridor or are critical for overall corridor implementation in such countries.

14.4 Institutional and Implementation Framework

Need for Program Management Approach

MIEC program would comprise of a large number of projects, some of which would be amenable to commercial implementation on a Public-Private-Partnership (PPP) basis. However, there would also be a large number of projects within MIEC, which would require to be implemented by respective government/multilateral/bilateral donor agencies. The effective implementation of MIEC requiring investments on infrastructure development/augmentation on a large scale would largely depend upon the coordinated efforts from participating countries, private sector, multilateral donor agencies, etc. It is inevitable that a program[65] of this magnitude, complexity and diverse objectives will require rigorous program management.

In order to ensure that the traditional pitfalls of program implementation are overcome, it is proposed that a Program Management Approach be adopted, wherein each facet of the identified projects within the program is rigorously developed from an engineering, financial, contractual, environmental and social perspective, along with inter-linkages, on prioritization and selective basis and prior to commencement of implementation. A program of this magnitude would also require significant upfront financial resources to develop and structure activities in an optimum manner. Keeping this vision in mind, an appropriate institutional mechanism that is able to exercise oversight and governance becomes critical. Accordingly, the approach to program implementation will require integrating the various elements of focused project development approach.

Proposed Implementation Framework

It is felt to create a Single Dedicated Development Agency (SDDA) which would essentially take the 'ownership' of program. An organization with ownership and capacity to work independently from development agenda of governments would be vital for MIEC. This single dedicated entity shall act as a **'corridor manager'.** The SDDA as a multi-faceted organization would be responsible for planning, coordination, and implementation of suggested action plans/projects (including associated managerial support and funding) and other activities related to development of corridor. It is envisaged that institutional framework towards program management be generally comprised of following Four Tier system:

- ✓ **An Apex Steering Authority** shall be headed by country heads of the respective countries along with their representatives (if needed) as members, to provide strategic support to create conducive political environment needed for successful implementation of the program.

- ✓ **A Single Dedicated Development Agency (SDDA)** shall be created with support from the respective national governments and the multilateral/bilateral donor agencies, private sector etc. as a servicing agency and coordinate execution of various tasks for the program management, project development, and provide advisory services for successful project preparation, development, financing and implementation. The main functions of SDDA would be:

    a. To act as a comprehensive program management, project planning and development entity;

[65] Note: **"Program"** means planning and development of "Mekong India-Economic Corridor (MIEC)" comprising of various projects viz. Industrial Corridors, development of expressways, other infrastructure projects and other activities as proposed in this concept paper

b. To facilitate the process of project identification, project prioritization, and master planning of identified projects, growth poles and growth nodes in MIEC;
c. To provide necessary financial assistance required for program/project development by mobilizing the resources from various stakeholders;
d. To facilitate ease of operation and participation of respective countries in MIEC development program;
e. To act as a single window clearance agency taking upon itself the task of co-ordination with and seeking of clearances from various agencies of concerned countries;
f. To address environmental concerns and ensure that the developments in MIEC are environment friendly;
g. To prioritize high technology and export oriented industries with high employment generation potential;
h. To ensure adequate social and community development perspective to improve the quality of life of people in the region.

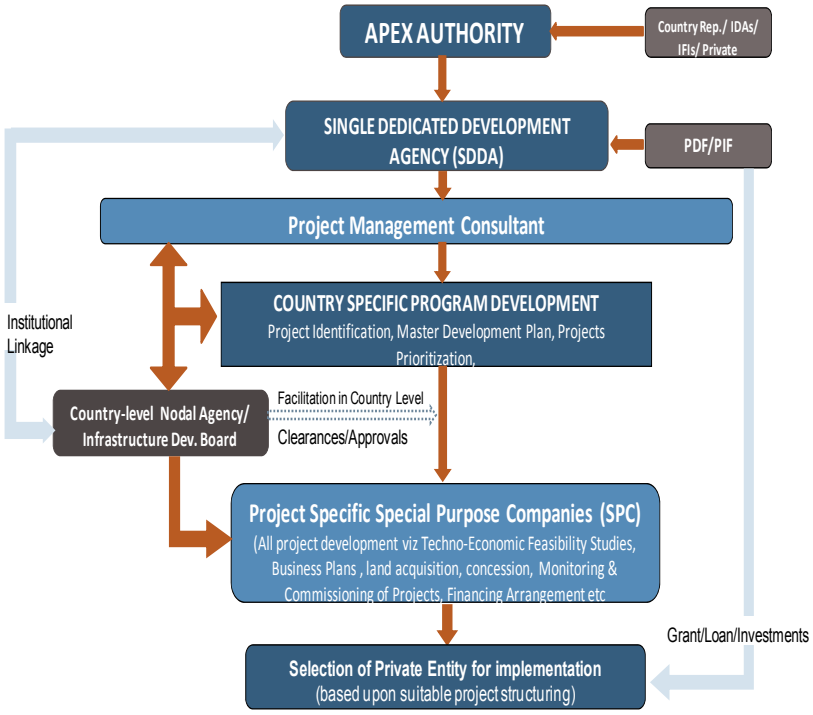
- ✓ **Infrastructure Development Board/National Level Coordination Entity/Nodal Agencies** shall be a dedicated entity created with representatives from planning, finance, industries, commerce and other relevant ministries/departments of the respective countries. This board shall be responsible for coordination needed between SDDA and various ministerial groups/departments/agencies of the respective national governments with the larger objective of facilitating the implementation of country specific program/projects being envisaged under MIEC program.

- ✓ **A Master Project Management Consultant (PMC)** shall work under the aegis of SDDA to provide necessary advisory assistance with respect to the project preparation, development, financing and implementation. The main role of Master PMC as envisaged is as follows; 1) Preparation of Program Plan, 2) Selection and Supervision of Consultants, 3) Project Development Fund Management, and 4) Coordination with Stakeholders.

- ✓ **Project Specific Entities** such as Special Purpose Vehicles, which could be (i) entirely private sector entities, (ii) entities with joint-venture between public and private, or (iii) purely public sector entities, depending upon the type of projects being implemented. The structuring option to be chosen should be best suited for the project in question, the legal and regulatory framework in the country. The roles and responsibilities of the Project Specific Special Purpose Vehicles will include design, finance, construct, operate, maintain and collect user charges/ toll, sharing revenue with respective government agencies and transferring the project assets to the concerned agency at the end of concession period.

Since multiple countries and development agencies are involved in the development of MIEC, the formation of SDDA may take some time. Therefore in order to kick-start the project development process in MIEC region, ERIA can act as a coordinating agency for the initial period till a dedicated SDDA is created.

Figure 3: Proposed Implementation Framework



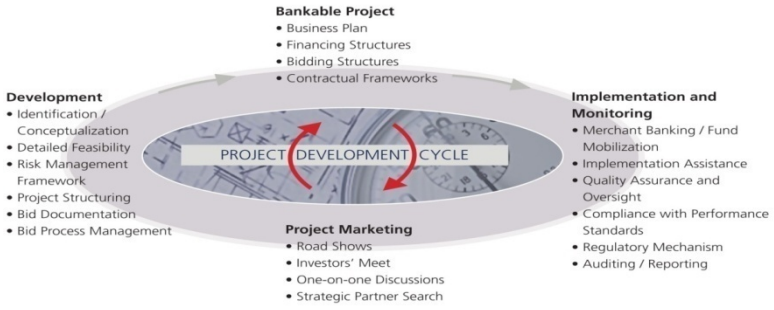
14.5 Structured Project Development Approach

The projects in MIEC can be structured differently depending upon the nature of projects in terms of risk-return relationship, capital requirement, and credit worthiness of some countries in corridor. Some projects would be amenable to commercial implementation on a Public-Private-Partnership (PPP) basis from the list of identified projects. Thus various models may be adopted towards the implementation of the projects identified under PPP in MIEC region. These models may vary from short-term simple management contracts (with or without investment requirements) to long-term and very complex BOT form. Adoption of a structured project development approach would lead to focused outputs and bring in credibility that would in-turn facilitate in developing a bankable project that incorporates the concerns of all the stakeholders during structuring of the project and preparation of the procurement documents.

Figure 4: Typical Project Development Approach

The structured project development approach follows a cyclic-iterative process and would typically involve the components viz:

- Project Conceptualization
- Project Documentation
- Technical Close
- Financial Close



14.6 Role of Project Management Consultant(s)

The Project Management Consultancy firm(s) may be appointed to develop the Project(s) as commercially viable and bankable propositions to enable completion of the project development activities and achieve an early financial closure. The PMC(s)' proposed role in assisting the SDDA would mainly be:

(a) **Preparation of Project Plan** in consultation with SDDA along with due consultations from respective Country Level Nodal Agencies for its successful development. The focus of the plan will be on projects identification, prioritization, selection, structuring and packaging, bundling/unbundling of various projects and assistance in getting approvals.
(b) **Selection and Supervision of Technical/Planning Consultants/Agencies** for preparation of feasibility/preliminary project reports/engineering studies. The PMC(s) would assist in reviewing/ preparing the risk management framework to enable to take view on overall risk profile, formulate strategies to deal with individual risk components and its impact on overall financials.
(c) **Coordination with Stakeholders** to achieve effective project planning, development and implementation of the identified project components.
(d) **Financial Structuring** to arrive at appropriate financing frameworks for various project components and to strike a balance between the objectives of SDDA, Country Level Nodal Agency and those of the prospective project investors/lenders in order to enhance the commercial viability of the overall project.
(e) **Formulation of Project Implementation Structure** taking into consideration the given risks and uncertainties that are usually associated in such projects. The PMC(s) would also work closely with the client in formulating an appropriate strategy for project implementation and operations.
(f) **Bid Process Management for selected PPP and EPC projects** to select suitable developers/ operators/ contractors for various project components and achieve technical and financial close. The PMC(s) may also help in incorporation of project specific Special Purpose Companies (SPCs) for implementation/ management of projects (if necessary).
(g) **Finalization of Project Execution and O&M Arrangements** for activities/components retained in Joint Venture SPCs and would also assist in developing bankable project execution, operations and maintenance frameworks.
(h) **Interface with Potential Investors** to identify support, incentives and concessions required for effective and efficient implementation of projects.

15. Suggested MIEC Action Plan

It is envisaged that implementation of various identified projects in MIEC would be done in two phases spread over the time period of 10 years (2009-2019) starting from July 2009. A time frame of four years is envisaged for short-term (2009-2013) and beyond four years is considered as a medium-term period.

ERIA has constituted a Working Group for advising and monitoring the planning of various development initiatives under MIEC. The Working Group comprises of all the primary stakeholders including senior officials from line ministries and premier academic institutions from the countries in corridor. Apart from these, the Working Group also has the members from Industries and Chambers of Commerce of countries in corridor, Japan Overseas Development Corporation (JODC), Japan External Trade Organization (JETRO), ERIA and consultants working on the preparation of MIEC plan.

It may be noted here that the members of Working Group are key policy makers and specialists from respective sectors who have been actively involved in planning and development of MIEC.

The overall suggested action plan is divided into two phases:

a) **Short-term action plan** –first 4 years for development of projects selected and prioritized by Working Group from the lists of priority and key projects

b) **Medium-term action plan** – beyond 4 years for developing projects (other than the projects considered in the short-term) as selected and prioritized by Working Group

15.1 Short-term Action Plan

The short-term action plan essentially involves the planning and development of projects that the Working Group will select and prioritize from the list of priority and key projects.

The step-wise approach for development of priority projects is as follows:

(a) Selection and Prioritization of Projects by Working Group
(b) Identification and Selection of Consultants
(c) Preparation of Technical and Feasibility Studies
(d) Institutional and Legal Review from a PPP Perspective
(e) Formulation of Project Implementation Structure
(f) Marketing of Projects
(g) Procurement of Developers/Contractors
(h) Supervision of Developers/Contractors

It may be noted that ERIA would co-ordinate the project development activities till a dedicated agency is created. To do this ERIA would either develop its internal capacity to undertake the specialized tasks or appoint Project Management Consultant(s) (PMCs) who would provide necessary advisory assistance with respect to the specialized tasks as above mentioned.

The prioritization of projects and their planning are proposed to be completed by July 2010 and implementation by July 2013. This includes the time period required for developers' procurement through the competitive bidding.

15.2 Medium-term Action Plan

The medium-term action plan is proposed to undertake project planning and development activities for identified projects other than the priority projects. This may also include a few priority projects which may not require to be developed during short-term action plan.

The approach suggested for development of projects is as follows:

(a) Prioritize key projects from the list of priority and key projects by the WG
(b) Undertake and supervise project preparatory, development and implementation activities of the prioritized projects
(c) Preparation of detailed development plans/master plans/tourism plans/concept plans of the identified growth poles and growth nodes
(d) Spatial planning to place the identified potential projects in overall development plans of growth poles and growth nodes
(e) Potential demand assessment of the proposed projects in the market through market/industry research
(f) Preparation of technical, economic, financial, political and legal feasibility studies of the identified projects
(g) Undertake environmental and social rehabilitation studies as development of various projects would affect the region's ecology (due to presence of Cardamom Mountains in Cambodia, various life sanctuaries enroute, etc.) and human settlements in the region

(h) Determine the detailed framework and prioritization of projects for implementation based upon demand assessment, feasibility studies and interest of various industrial groups/organizations towards the proposed projects
(i) Marketing of projects
(j) Selection and supervision of developers

The prioritization, planning and implementation activities of high potential projects are proposed to complete between 2013 and 2019.

The action proposals mentioned above are therefore represented by a finite set of initiatives that have been prioritized but for which it is not possible to provide ordinal properties, due to the need for implementation "in parallel" and the multi-structured nature of envisaged implementation structuring.

The summary of total investments (based on costs of development of priority and key projects provided in Annexure 2) in the infrastructure development in MIEC is tabulated below:

Table 13: Summary of Project Costs

Description	Project Cost (USD Million)
Priority Projects	3,730
Key Projects	84,440
Total Cost (USD Million)	**88,170**

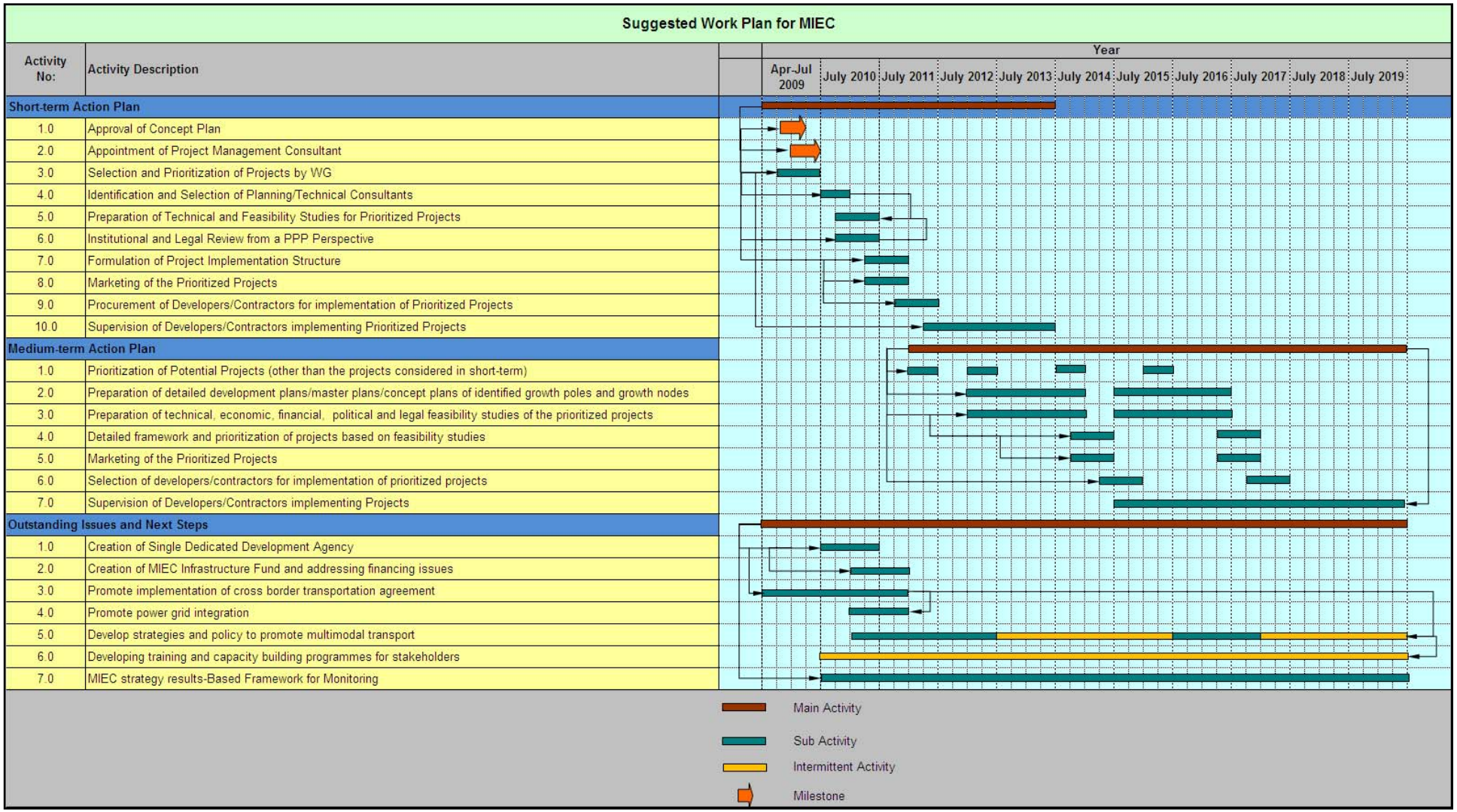
The total investment requirements for the development of world class infrastructure (in terms of roads, railways, airports, port, power, industrial estates, healthcare, human resource development and allied social infrastructure) in MIEC would be about USD 88.17 Billion. The total investment requirement for development of priority projects is estimated as USD 3.7 Billion and for development of model PPP projects (presented in Annexure 2) is estimated to the tune of USD 3.9 Billion.

The effective implementation of various projects in the corridor also depends upon a few softer issues (detailed below) which hold the key of achieving the economic integration of countries in corridor. These issues are critical and need to be addressed on priority to achieve the effective implementation of overall corridor concept. Sincere efforts are to be required by member countries and associated multi-lateral organizations to resolve these issues which should ideally be initiated along with the inception of the short-term plan. Some of the key issues are:

1. Creation of Single Dedicated Development Agency
2. Set-up ASEAN infrastructure fund to address the financing Issues
3. Promote Implementation of cross border transportation agreement
4. Promote power grid integration in MIEC region
5. Development of strategies to promote multimodal transport
6. Focus on training and capacity building of stakeholders
7. Development of MIEC strategy results-based framework for monitoring

The work plan presents in the following figure entails details regarding likely scheduling of the identified projects, timelines with respect to addressing specific issues taking into account governance and other procedural delays.

Figure 5: Suggested Work Plan for Development of MIEC



ANNEXURE 1 – ERIA POLICY BRIEF NO. 1

RIA-PB-2009-01

"Why Is the East Asia Industrial Corridor Needed?"

Fukunari Kimura
Izuru Kobayashi

The East Asia Industrial Corridor Project, in particular the Southern Corridor and its extension, can be a path-breaking effort for attaining both deepening economic integration and narrowing development gaps. New economic thoughts claim the necessity of comprehensive approach in which various policy modes and a number of stakeholders are effectively coordinated.

1. Deepening economic integration and narrowing development gaps

The Economic Research Institute for ASEAN and East Asia (ERIA) was established to conduct concrete policy research for the development of our region, particularly to (i) deepen economic integration; (ii) narrow down development gaps; and (iii) attain sustainable economic development. The ERIA believes that the new wave of international trade theories, namely, the fragmentation theory and new economic geography, can be a powerful tool in designing our development strategies for these goals. The new economic thought tells us how globalizing forces can be utilized effectively to relocate economic activities from existing industrial agglomerations to relatively lagging-behind countries or regions and to expand the frontier of international production networks. With the help of policies that are properly designed, implemented, and backed by rigorous economic and physical analyses, globalizing forces can be a blessing rather than a curse by accelerating economic growth and enhancing national welfare with poverty alleviation.

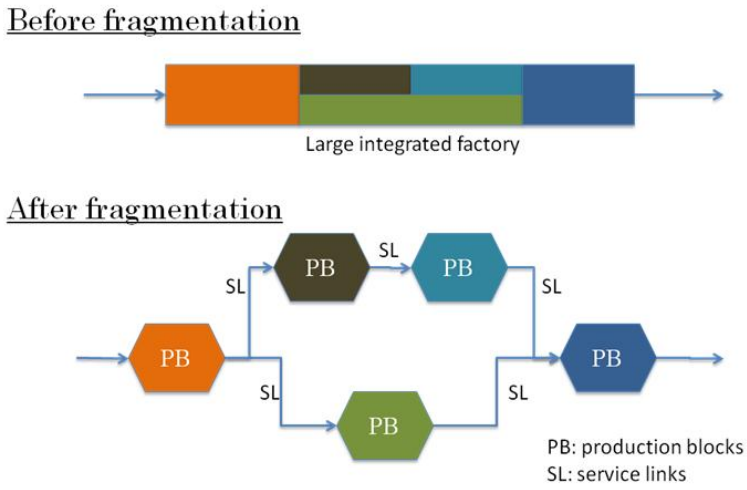
The East Asia Industrial Corridor, particularly the second East-West or Southern Corridor and its extension (from Ho Chi Minh City to the East Coast of India through the Bangkok Metropolitan Area), is the most promising project for which our approach can be applied.

2. Why "industrial corridor"?

For the latecomers in the ASEAN, initiatives such as the Greater Mekong Subregion (GMS) Development with the assistance of the Asian Development Banks (ADB), have brought about significant achievements, particularly in the construction of main road networks. The ERIA project respects these initiatives and tries to add more enthusiasm by effectively coordinating various policy modes as well as bringing together the stakeholders in order to pursue both deepening economic integration and narrowing development gaps.

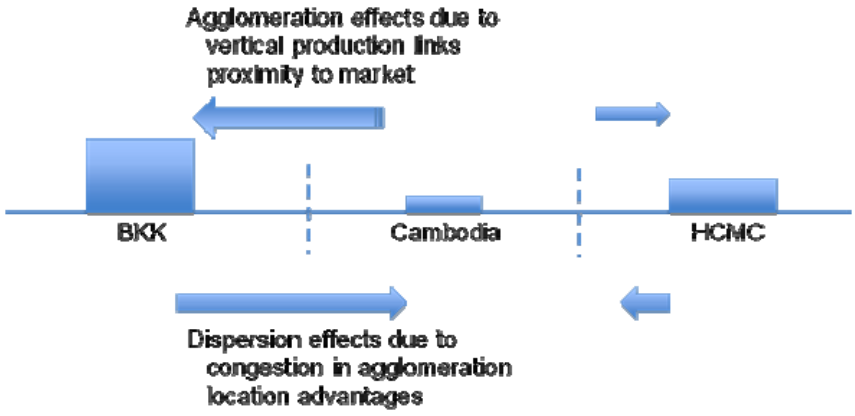
The fragmentation theory argues that the key to attract fragmented production blocks is to (i) improve location advantages by, for example, developing special economic zones with at least an improved local-level investment climate; and (ii) reduce the cost of service links that connect remotely located production blocks by improving customs procedures, developing logistic infrastructure, and others (Figure A1).

Figure A1. The Fragmentation Theory: Production Blocks and Service Links



New economic geography, on the other hand, suggests that peripheries may attract economic activities by effectively utilizing dispersion forces from neighboring cores with congestion (Figure A2).

Figure A2. New Economic Geography: Dynamism of Agglomeration and Dispersion



Our conceptual framework based on these theories helps us identify bottlenecks in the development of latecomers and construct a comprehensive implementation scheme. A holistic approach necessarily involves various stakeholders and players, including a number of ministries and agencies of central and local governments, international aid agencies, multinational and local firms, and local communities. The concept of industrial corridor invigorates the coordination and concentration of available resources. One of the models where we can draw lessons from is the Delhi-Mumbai Industrial Corridor Project in which ambitious collective efforts are going on.

3. Financial crisis and re-trending flows of regional financial resources

The current financial crisis that originated from North America and Europe brought uncertainty in the world economy, and we are now forced to take all necessary remedies to mitigate its negative impacts, particularly against unwarranted ---though possibly self-fulfilling--- bad expectations in the market. To boost our own confidence, it is now crucial to keep investing in good projects linked to strong economic growth in the middle and long run, in addition to generating possible economic stimulus in the short run.

A large portion of our financial resources coming from our own high savings has not so far been directly invested in our region but has once been diverted to North America and Europe then invested back to East

Asia. We should therefore reinforce our own channel of financial resource circulation within the region. Together with the effective combination of public and private resources, well-functioned development strategies with proper financial architecture should be established.

The East Asia Economic Corridor can be a pioneering effort at coordinating both the real and financial economies in the region.

Figure A3. Population Growth (2005-2025): Base Line

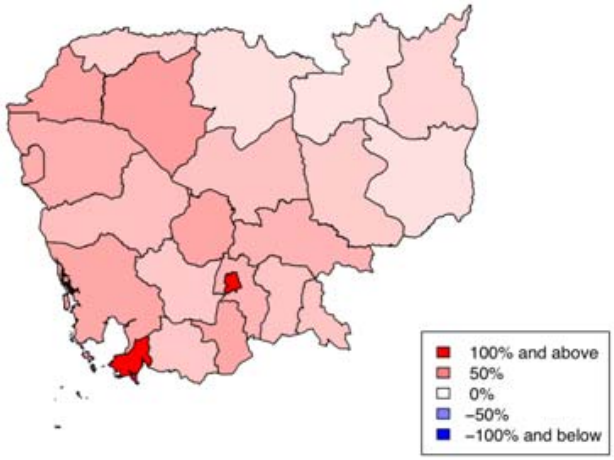


Figure A4. GDP Difference (2025): Southern Economic Corridor vs Base Line

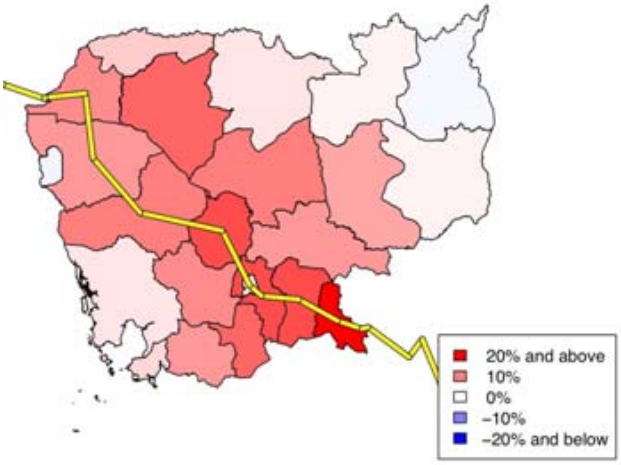
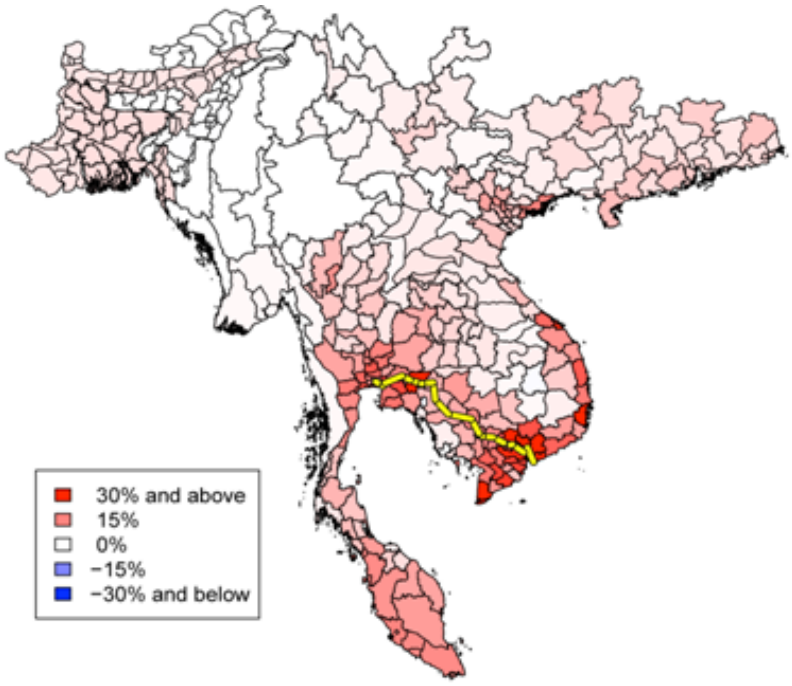


Figure A5. GDP Difference (2025): Southern Economic Corridor vs Base Line



4. What new economic geography tells us?

As shown in Figure A2, new economy geography presents a theoretical "knife edge" between concentration and dispersion of economic activities when transport costs come down. When highways are constructed and trade facilitation is enforced, industrial activities may either be further attracted to cores or relocated to peripheries. Which force is stronger depends on delicate parameter conditions. The Geographical Simulation Model developed by the IDE-JETRO GSM Team can actually check the nature of concentration and dispersion.[66]

The Geographical Simulation Model simulates the effect of trade cost reduction on the geographical distribution of population and economic activities. Figure A3 displays population growth in Cambodia during the period 2005-2025 in the benchmark case. Then a simulation is conducted for the case in which a highway between Ho Chi Minh City and Bangkok is constructed and customs clearance is improved. The simulation results vis-à-vis the benchmark case in terms of the difference in GDP are presented in Figures A4 and A5.

The key findings are twofold. First, the construction of the highway with trade facilitation is likely to generate additional economic growth in lagging-behind countries/regions along the corridor. It means that Cambodia, for example, does not need to worry about massive resource drain but can rather expect inflows of economic activities. Second, however, larger beneficial impact is generated for existing industrial agglomerations in the Bangkok Metropolitan Area and Ho Chi Minh City. This suggests that Cambodia, in order to capture larger benefits, should apply a holistic approach in the improvement of its investment climate. Such an approach should include not only the construction of highways but also the development of special economic zones, container yards, overall economic infrastructure, and human resources with well-executed coordination among various stakeholders.

5. The ERIA's initiative for East Asia Industrial Corridor

The ERIA will take an initiative, in close coordination with existing efforts, for drawing a comprehensive master plan for the development of the East Asia Industrial Corridor. Such plan will lead various stakeholders to effectively participate in forthcoming physical design and implementation of the project.

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Acknowledgement

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Kumagai, Satoru; Gokan, Toshitaka; Isono, Ikumo; and Keola, Souknilanh. (2008) "Predicting Long-term Effects of Infrastructure Development Projects in Continental South East Asia: IDE Geographical Simulation Model." ERIA Discussion Paper Series ERIA-DP-2008-02. Available at http://www.eria.org.

[66] As for the structure and functioning of the GSM model, see Kumagai, Gokan, Isono, and Keola (2008)

ANNEXURE 2 – LIST OF PROJECTS

List of Priority Projects

Component	Sector	Project	Project Cost (USD Million)
Transport Linkage	Roads	Upgradation of road link between Poipet and Bavet from 2-lane to 4-lane as access controlled expressway	800
Transport Linkage	Roads	Upgradation of road link between Phnom Penh and Sihanoukville port from 2-lane to 4-lane as access controlled expressway	300
Transport Linkage	Roads	Construction of Bypass around Phnom Penh City	90
Transport Linkage	Roads	Upgradation of road link between Moc Bai and Vung Tau from 4-lane to 6-lane as access controlled expressway	350
Transport Linkage	Roads	Upgradation of road link between Can Tho and Ho Chi Minh City from 4-lane to 6-lane as access controlled expressway	450
Transport Linkage	Roads	Construction of Bypass around Ho Chi Minh City	125
Transport Linkage	Roads	Development of road links from Dawei port to Bong Tee (Thailand border) and road from Bong Tee to Kanchanaburi in Thailand as 4-lane access controlled expressways	400
Transport Linkage	Ports	Development of Greenfield Deep Sea Port at Dawei	500
Transport Linkage	Ports	Development of Transshipment Port at Vung Tau-Ba Ria province in Vietnam	250
Transport Linkage	Logistics	Multi-modal Logistics Park at Vung Tau-Ba Ria (Vietnam)	145
Transport Linkage	Logistics	Multi-modal Logistics Park at Sihanoukville (Cambodia)	100
Transport Linkage	Logistics	Multi-modal Logistics Park at Border (Aranyaprathet-Poipet)	80
Transport Linkage	Logistics	Multi-modal Logistics Park at Border (Moc Bai-Bavet)	80
Transport Linkage	Cross-border	Construction of Cross-border facilities at (Aranyaprathet-Poipet)	20
Transport Linkage	Cross-border	Construction of Cross-border facilities at (Moc Bai - Bavet)	20
Transport Linkage	Cross-border	Construction of Cross-border facilities at (Ban Bon Tee at Thai-Myanmar border)	20
Total Cost (USD Million)			**3,730**

List of Key Projects

Component	Sector	Project	Project Cost (USD Million)
Transport Linkage	Roads	Upgradation of road link from Chamkar Luang (75 km from Sihanoukville in Koh Kong province) to Koh Kong from 2-lane to 4-lane as access controlled expressway	300
Transport Linkage	Roads	Upgradation of road link from Poipet to Phnom Penh via Siem Reap from 2-lane to 4-lane as access controlled expressway (or new construction of 4lane road)	1,000
Transport Linkage	Roads	Development of important Rural Roads in Cambodia and Vietnam	11,200
Transport Linkage	Roads	Upgradation of service link from Siem Reap to Battambang via Sisophon from 2-lane to 4-lane configuration	210
Transport Linkage	Roads	Construction of Greenfield Expressway from Go Dau Ha to Vung Tau Transshipment Port	700
Transport Linkage	Ports	Capacity Expansion of Laem Chabang Ports	400
Transport Linkage	Ports	Capacity Expansion of Sihanoukville Ports	100
Transport Linkage	Ports	Capacity Expansion of Cai Mep-Thi Vai Ports	1,500
Transport Linkage	Rail	Construction of Ho Chi Minh City-Vung Tau (Cai Mep-Thi Vai Ports) Rail Link	500
Transport Linkage	Rail	Construction of missing Link from Phnom Penh-Ho Chi Minh City	1,200
Transport Linkage	Rail	Construction of missing Link Nam Tok (Thailand)-Dawei (Myanmar)	650
Transport Linkage	Airports	Upgradation of Can Tho Airport in Vietnam	35
Transport Linkage	Airports	Upgradation of Sihanoukville Airport in Cambodia	20
Transport Linkage	Airports	Upgradation of Dawei Airport in Myanmar	55
Transport Linkage	Logistics	Multi-modal Logistics Park at Battambang (Cambodia)	70
Transport Linkage	Logistics	Multi-modal Logistics Park at Border (Bong Tee at Thai-Myanmar border)	100
Transport Linkage	Logistics	Multi-modal Logistics Park at Chachoengsao-Prachinburi (Thailand)	70
Transport Linkage	Logistics	Multi-modal Logistics Park at Dawei (Myanmar)	105
Support Infrastructure	HRD	Knowledge City at Chachoengsao-Prachinburi in Thailand	300
Support Infrastructure	HRD	Knowledge City at Phnom Penh in Cambodia	240

Component	Sector	Project	Project Cost (USD Million)
Support Infrastructure	HRD	Knowledge City at Ho Chi Minh in Vietnam	180
Support Infrastructure	HRD	Knowledge City at Dawei in Myanmar	90
Support Infrastructure	HRD	Agriculture University at Battambang	50
Support Infrastructure	Power	500 MW Sihanoukville Coal-fired Power Plant, Cambodia	600
Support Infrastructure	Power	1200 MW Soc Trang I Gas Power Plant	1,450
Support Infrastructure	Power	2 x 600 MW Son My Thermal Power Plant (Unit 1 – 2)	1,500
Support Infrastructure	Power	2 x 600 MW Son My Thermal Power Plant (Unit 3 – 4)	1,500
Support Infrastructure	Power	600 MW Hydro Power Project in Taninthyari, Myanmar	800
Support Infrastructure	Power	700 MW Gas-Fired Power Plant at Dawei	560
Support Infrastructure	Power	2000 MW Nuclear Power Plant in Ninh Thuan province, Vietnam	3,600
Support Infrastructure	Power	100 MW hydro power plant in Lam Dong province, Vietnam	180
Support Infrastructure	Power	Double Circuit 230 kV Kanchanaburi-Dawei Transmission Line between Myanmar and Thailand	80
Support Infrastructure	Power	500 kV Can Tho – Ho Chi Minh City Transmission Line	75
Support Infrastructure	Power	200 kV Chau Doc-Can Tho Transmission Line *(continuation of 230 kV Phnom Penh-Takeo-Vietnam Transmission Line)*	40
Support Infrastructure	Power	Double Circuit 230 kV Myeik-Phetchaburi Transmission Line between Myanmar and Thailand	40
Support Infrastructure	Power	Up-gradation of 115 kV Thailand – Bantey Meanchey – Siem Reap – Battambang transmission line from single circuit to double circuit	30
Support Infrastructure	Power	300 kW PV Solar Power Plant at Svay Rieng, Cambodia	1.5
Support Infrastructure	Power	600 kW Bio-gas Power Project at Battambang, Cambodia	2
Support Infrastructure	Power	3 MW Wind based Power Project at Binh Thuan, Vietnam	5
Support Infrastructure	Health	Multi-Specialty Hospital and Medical Education City in Siem Reap	60
Support Infrastructure	Health	Multi-Specialty Hospital and Medical Education City in Can Tho	60
Support Infrastructure	Health	Multi-Specialty Hospital and Medical Education City in Dawei	60

Component	Sector	Project	Project Cost (USD Million)
Support Infrastructure	Health	Advanced Cancer Diagnostic and Treatment Centre at HCM City Growth Node	30
Support Infrastructure	Health	Integrated Mother and Child Care Centre and Training Institute at Battambang and Phnom Penh-Kandal	30
Support Infrastructure	Health	Rehabilitative and Occupational Therapy Centre at Battambang	30
Support Infrastructure	Health	Regional Eye Care and Post-Graduate Research Centre at HCM City	30
Growth Node/pole	Industrial Infrastructure	Development of Agri-Processing Zone at Can Tho-Vinh Long	-
Growth Node/pole	Industrial Infrastructure	- Food Processing Park	150
Growth Node/pole	Industrial Infrastructure	- Integrated Agro-Export Complex	50
Growth Node/pole	Industrial Infrastructure	- Food Processing Training Centre	5
Growth Node/pole	Industrial Infrastructure	- Farmers Training Institute	5
Growth Node/pole	Industrial Infrastructure	- Centre for Food Safety and Research	5
Growth Node/pole	Industrial Infrastructure	Development of Agri-Processing Zone at Battambang	-
Growth Node/pole	Industrial Infrastructure	- Food Processing Park	160
Growth Node/pole	Industrial Infrastructure	- Integrated Agro-Market Complex	30
Growth Node/pole	Industrial Infrastructure	- Farmers Training Institute	5
Growth Node/pole	Industrial Infrastructure	- Pre-Harvest Facilitation Centre	10
Growth Node/pole	Industrial Infrastructure	Seafood processing Park in Ba Ria-Vung Tau Growth Node	10
Growth Node/pole	Industrial Infrastructure	Seafood processing Park at Sihanoukville Growth Node	10
Growth Node/pole	Industrial Infrastructure	Seafood processing Park at Dawei Growth Node	10
Growth Node/pole	Industrial Infrastructure	Mega Industrial Zone in Pathum Thani CDZ	700
Growth Node/pole	Industrial Infrastructure	IT and ITES Park at Pathum Thani CDZ	100
Growth Node/pole	Industrial Infrastructure	Mega Industrial Zone in Samut Prakan CDZ	950
Growth Node/pole	Industrial Infrastructure	Mega Industrial Zone in Phnom Penh-Kandal CDZ	1,400

Component	Sector	Project	Project Cost (USD Million)
Growth Node/pole	Industrial Infrastructure	Mega Industrial Zone at Bien Hoa CDZ	1,400
Growth Node/pole	Industrial Infrastructure	Software Technology Park at HCM City	80
Growth Node/pole	Industrial Infrastructure	Mega Industrial Zone in Chachoengsao-Prachinburi Growth Node	3,200
Growth Node/pole	Industrial Infrastructure	Mega Industrial Zone in Ayutthaya Growth Node	3,200
Growth Node/pole	Industrial Infrastructure	Pharma and Biotech City in Ayutthaya Growth Node	80
Growth Node/pole	Industrial Infrastructure	Mega Industrial Zone and International Trade Exchange Centre in Kanchanaburi Growth Node	2,500
Growth Node/pole	Industrial Infrastructure	Mega Industrial Zone in Sihanoukville Growth Node	2,200
Growth Node/pole	Industrial Infrastructure	SEZ/Free Trade Zone and International Trade Exchange Centre at Poipet-Sisophon Growth Node	1,800
Growth Node/pole	Industrial Infrastructure	SEZ/Free Trade Zone and International Trade Exchange Centre at Svay Rieng-Bavet Growth Node	1,800
Growth Node/pole	Industrial Infrastructure	SEZ/Free Trade Zone and International Trade Exchange Centre at Dawei Growth Node	600
Growth Node/pole	Industrial Infrastructure	Mega Industrial Zone in Ba Ria-Vung Tau Growth Node	3,500
Growth Node/pole	Industrial Infrastructure	Petro-chemical complex in Ba Ria-Vung Tau Growth Node	300
Growth Node/Pole	Tourism Infrastructure	Eco Park and campsite at Kanchanaburi Eco-Tourism Zone	5
Growth Node/Pole	Tourism Infrastructure	Adventure sports complex at Kanchanaburi Eco-Tourism Zone	4
Growth Node/Pole	Tourism Infrastructure	Resort Town at Kanchanaburi Eco-Tourism Zone	50
Growth Node/Pole	Tourism Infrastructure	Water front development project for Sihanoukville Tourism zone	10
Growth Node/Pole	Tourism Infrastructure	Marina at Sihanoukville Tourism zone	7
Growth Node/Pole	Tourism Infrastructure	Water sports complex at Sihanoukville Tourism zone	3
Growth Node/Pole	Tourism Infrastructure	Eco Park and campsite at Koh Kong Eco-Tourism Zone	6
Growth Node/Pole	Tourism Infrastructure	Water sports complex at Koh Kong Eco-Tourism Zone	5
Growth Node/Pole	Tourism Infrastructure	Adventure sports complex at Koh Kong Eco-Tourism Zone	4
Growth Node/Pole	Tourism Infrastructure	Beach/Resort town at Koh Kong Eco-Tourism Zone	50

Component	Sector	Project	Project Cost (USD Million)
Growth Node/Pole	Tourism Infrastructure	Resorts / Beach Town at Dawei Tourism Zone	50
Growth Node/Pole	Tourism Infrastructure	Marina/Piers at Dawei Tourism Zone	10
Growth Node/Pole	Tourism Infrastructure	Water sports complex at Dawei Tourism Zone	5
Growth Node/Pole	Tourism Infrastructure	Resort/ Heritage Town at Siem Reap-Battambang Tourism Corridor	50
Growth Node/Pole	Tourism Infrastructure	Cultural Complex and Craft Village at Siem Reap-Battambang Tourism Corridor	5
Growth Node/Pole	Tourism Infrastructure	Heritage Resort at Mekong Tourism Zone	50
Growth Node/Pole	Tourism Infrastructure	Cultural Complex and Craft Village at Mekong Tourism Zone	5
Growth Node/Pole	Tourism Infrastructure	Water front development project for Vung Tau Tourism Zone	10
Growth Node/Pole	Tourism Infrastructure	Marina at Vung Tau Tourism Zone	7
Growth Node/Pole	Tourism Infrastructure	Water sports complex at Vung Tau Tourism Zone	5
Social Infrastructure	Social Infrastructure	Social Infrastructure (including Integrated Townships)	30,000
Total Cost (USD Million)			**84,440**

List of Model PPP Projects

Component	Sector	Project	Project Cost (USD Million)
Transport Linkage	Roads	Upgradation of road link between Phnom Penh and Sihanoukville port from 2-lane to 4-lane as access controlled expressway	300
Transport Linkage	Roads	Upgradation of road link between Moc Bai and Vung Tau from 4-lane to 6-lane as access controlled expressway	350
Transport Linkage	Roads	Upgradation of road link between Can Tho and Ho Chi Minh City from 2-lane to 6-lane as access controlled expressway	450
Transport Linkage	Roads	Construction of Bypass around Ho Chi Minh City	125
Transport Linkage	Ports	Development of Transshipment Port at Vung Tau-Ba Ria province in Vietnam	250
Transport Linkage	Logistics	Multi-modal Logistics Park at Vung Tau-Ba Ria (Vietnam)	145
Transport Linkage	Logistics	Multi-modal Logistics Park at Sihanoukville (Cambodia)	100
Support Infrastructure	Power	500 MW Sihanoukville Coal-fired Power Plant, Cambodia	600
Support Infrastructure	Power	2 x 600 MW Son My Thermal Power Plant (Unit 1 – 2)	1,500
Support Infrastructure	Health	Multi-Specialty Hospital and Medical Education City in Siem Reap*	60
Support Infrastructure	Health	Multi-Specialty Hospital and Medical Education City in Can Tho*	60
		Total Cost (USD Million)	**3,940**

** Designing and construction of facility is proposed on public finance. Private sector would operate and maintain the hospital. Operator would also be responsible for delivery of health services to patients from EWS.*

ANNEXURE 3 – DEVELOPMENT OF THAILAND'S SOUTHERN SEABOARD

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Thailand Development Research Institute

A3.1 Background

The National Economic and Social Development Board (NESDB) is the main agency in pursuing the national economic and social development plan. The first National Economic Development Plan (NEDP) was prepared in 1961. Since then, these plans, now called National Economic and Social Development Plans (NESDPs), were continually updated. The current plan is the 10th NESDP, which is now in operation (from 2007 to 2011).

The key development in the early plans is the infrastructure development focus which was characterized by emphasis on the development of key economic areas such as the Eastern Seaboard and the key basic infrastructure such as highway and public utilities. Later, the plans focused on the social development and economic integration. Presently, the 10th NESDP focuses on social development, popular governance and economic competiveness and management. A report of ADB and NESDB (ADB and NESDB, 2008) summarized four key goals of the 10th NESDP below.

Goal 1: Eliminate poverty through sustained and equitable economic growth. The plan is designed to strengthen the Thai society and local communities, promote indigenous wisdom and reform the economic structure for sustainable growth.
Goal 2: Enhance environmental security and sustainability. This involves promoting the "Green and Happiness Society" Program and increasing awareness among communities about the environment.
Goal 3: Create a knowledge-based society and social security. This will promote self-sufficiency at all levels of the society and business community, as well as quality of life of the people, for the society to become a knowledge based and life-long learning society.
Goal 4: Ensure good governance at all levels of society. The green and happiness society will be achieved by strengthening communities' capabilities, promoting public and private governance, promoting distribution of wealth, balancing economic development and increasing access to education.

ADB and NESDB (2008) suggested that spatial planning remains a key function of the plans as manifested by the strategic policy of redistributing new industry away from the Eastern Seaboard, which is perceived as having limited capacity for future expansion, towards the south of Thailand. This major policy was endorsed by a cabinet resolution in February 2007 and a number of studies have since been undertaken by NESDB and other relevant ministries to identify opportunities for introducing new industrial development in areas outside the Eastern Seaboard, most notably including South Thailand. These include a number of sectoral studies that have focused on particular industries and economic sectors as well as different types of infrastructure needed to support any expansion in industrial development.

The background of the Southern Seaboard development plan was originally proposed in 1975. The first study was done by the Hunting Technical Service in 1975. In 1985, the Japan International Cooperation Agency (JICA) studies the development plan for the Southern Seaboard and there was a revised studied done by ADB in 1987. In 1989, NESDB proposed the southern region's strategic development plan to the cabinet and the cabinet approved the 'Land Bridge' development plan that connected Andaman Sea and Thai Gulf. This plan consists of a multi-modal transport linkage, which combined road, railway, and pipeline in the corridor. This was regarded as a beginning of the Southern Seaboard Development Plan.

NESDB was assigned to conduct the master plan of the southern seaboard development plan. In 1991, NESDB appointed a consortium (Bechtel, Nippon Koei, AEC and SEATEC) to prepare the master plan and

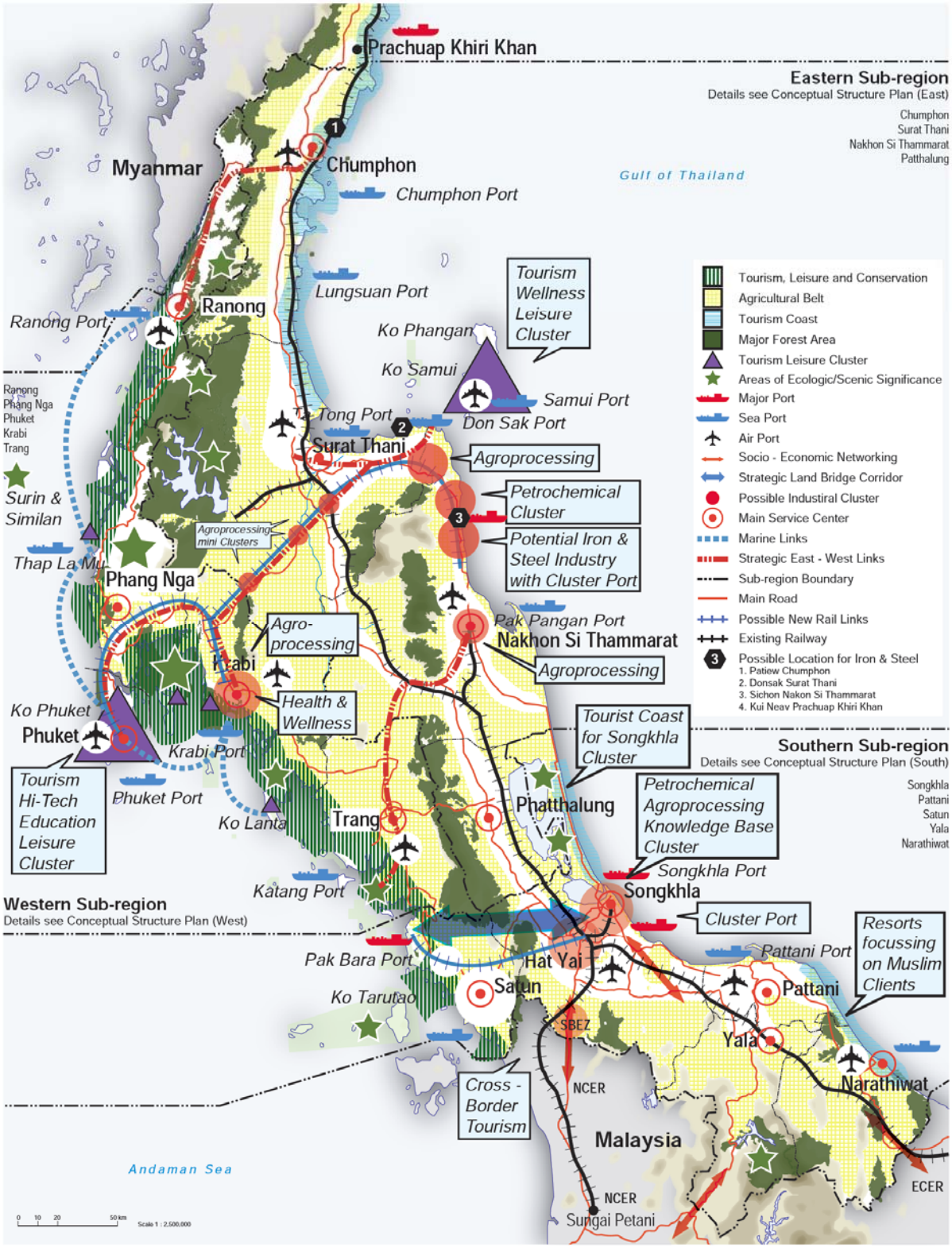
the plan was completed in 1992. The cabinet approved the master plan, in principle, also in 1993 and also approved several projects such as the construction of road between Krabi-Khanom. Later, the cabinet decided that the deep sea port development shall be in Satun province for Andaman Sea side and in Songkhla province for Thai Gulf side.

A3.2 Regional Development Concept

The report of ADB and NESDB (2008) proposed a regional development concept which based on sectoral analysis which consists of five sectors namely; agriculture and fisheries; heavy industry and energy; tourism; knowledge based industry and leisure; and environment. The regional development concept for South Thailand is shown in Figure A3.1.

This spatial concept provides a clear separation between the east and west coasts in keeping with the geographical differences. On the western Andaman coast, a tourism/leisure corridor has been defined in which heavy industry and large ports are precluded with the exception of a strategic port serving a landbridge corridor to the Gulf of Thailand (proposed at Pak Bara in Satun Province). On the east coast a mix of industrial, agriculture and tourism development is advocated, each spatially confined to specific areas where conflicts between the sectors are avoided or minimised. The southern sub-region is assigned as a major growth pole, to benefit from both a possible eastwest land-bridge development (instigated by foreign investment) and the emergence of cross border trade as boosted by the SBEZ and the continuation of the ECER and NCER corridors towards Songkhla and Hat Yai via the southernmost provinces.

Map A3.1 Regional Development Concept



Sources: ADB and NESDB (2008)

The report also suggests four concepts of development as follows.

A3.3 Strategic East West Connections

The preferred location for a strategic energy land-bridge, to provide port access from the Andaman Sea to the Gulf Coast of Thailand and which could allow raw materials and goods to be transported and processed along the way, is in the south of the region between Pak Bara and Songkhla. This would be a major economic corridor that would stimulate a variety of industries and commercial development, including the possibility of heavier industries on the east coast near Songkhla. Of the region's potential corridors identified, the southern corridor is preferred as:

- Port development can be more discreet and strategically isolated from the remainder of the Andaman coast;
- There is a larger critical mass of support services (urban development, education hub etc.) in the south;
- Cross-border opportunities are more abundant in the south;
- There are large hinterlands around Songhkhla and Hat Yai; and,
- A southern land-bridge would be able to respond better to critical problems in the Deep South.

A3.4 Tourism and Leisure Corridor on the Andaman Coast

The tourism/leisure corridor would develop as a world-renowned coast for tourism and complementary leisure/knowledge. It would extend from the Malaysian border to Ranong in the north, from which it can be linked to the east coast through the Isthmus of Kra to the designated Royal Coast.

The anchor and main activity node, from which such activities can gradually be expanded along the whole Andaman Coast, is Phuket, which is earmarked as a tourism, leisure/knowledge based node. It is already the main investment hub of the west coast. Here knowledge-based activities and tourism can be strengthened in the health and wellness, education and hi tech fields, as well as in specialist sports activities such as yachting. As recognised at the consultation workshops, the vast potential for Phuket in terms of new investments needs to be nurtured and properly structured.

A range of ecotourism and community based tourism (CBT) should be developed in the immediate hinterland of the coast, to spread tourism through such means as a tourism scenic drive, which would cover the whole coast. Greater use of marine cruises, within Phang Nga Bay and along the Andaman seaboard, could also be made to maximise the unique marine potential of the western region.

Behind the tourism/leisure corridor, the agricultural heartlands in Krabi and Trang (and to some extent Phang Nga) could be strengthened for agro-processing and the development of specialist foods (for example fruits) as higher value products, using the tourism coast as an initial market.

A3.5 Mixed Development on the East Coast

The key to the successful co-habitation of industrial and tourism uses on the east coast is the careful location and clustering of activities and sound land use control to prevent sprawl, ad hoc development and conflicts in interests. The designated Royal Coast, which consists of a large stretch of mostly sandy bays stretching from Surat Thani in the south to Prachuap Khiri Khan in the north is where a range of beach tourism resorts could be planned. With the exception of the existing iron and steel works at Bang Saphan and areas devoted to fish-ponds (for example near to Chumphon) much of this coast can be devoted to tourism uses. Tourism should however be planned in a sustainable manner, with clearly contained resorts linked with CBT in the hinterland and separated by buffer zones.

An important tourism node on the east coast is Samui, which could form the southern limit of the tourism zone. It could specialise in health and wellness and sports such as yachting as well as general leisure and some ecotourism on the more remote parts of the archipelago. Links with Phuket and the Andaman coast by means of Route 44 can be encouraged. The area would also need to command important buffer zones to protect its visual integrity.

The east coast could also accommodate important clusters of heavy industry, on the condition that these be spatially contained and subject to the highest standards of environmental quality and community consultation and involvement. Ideally a grouping of industrial clusters (or the merging of a 'super cluster') should be considered. A total of four sites are proposed where iron and steel could be located. One of these is in Prachuap Khiri Khan, the three others are within the study area at: Patiew, Chumphon; Don Sak, Surat Thani; and Sichon, Nakhon Si Thammarat.

Key principles for locating a site for heavy industry is that it should be visually screened from the island of Samui (making locations south of Khanom Port appropriate for example) to avoid conflicts with tourism. Ideally the site should be close to existing service centres such as Nakhon Si Thammarat and Surat Thani from where housing and community support facilities (schools, hospitals, commercial services etc) can easily be made available and expanded. These centres would also draw on a more skilled labour force. Good access to the main north-south road artery, Route 4, as well as to the main rail line and airports is also a requirement.

The locations would need to be served by a new 'cluster port', linked to the strategic road network and also, ideally, to a rail spur from the main north-south line. The spur for a site near to Sichon could be looped to connect to Nakhon Si Thammarat city: the latter could act as a service centre for the industrial area as well as being an agricultural service centre. A separate industrial cluster is proposed as an agro-processing centre in Surat Thani, at the culmination of Route 44. This would serve the large agricultural heartlands to the south and west. Both the heavy industry and the agro-processing centre would benefit from large, sparsely populated hinterlands made up of plantations that are well contained by a range of hills.

A3.6 Southern Development Node

The key catalyst to rejuvenate the whole of the southern sub-region, is the proposed land-bridge development between Satu (Pak Bara) and Songkhla. Pending such a development, a major growth node (in the form of a further cluster for education, R&D, agricultural processing and possibly petrochemicals) could be established in the south around Songkhla, with resulting spin off effects further south.

The southern land-bridge would be the main east-west connection, and have great strategic importance as it could bring major shipping lines to access directly the Gulf of Thailand from the Andaman Sea via the southern Sub-region. It would be necessary to use this investment wisely, as a means to instigate social and economic programmes in the sub-region, particularly those aimed at integrating the Deep South provinces within the expanded economy of South Thailand. Comprehensive and long term planning of the land-bridge, rather than a piecemeal approach is therefore required.

The southern part of the region would also build on the ECER and NCER links with Malaysia: the latter boosted by the proposed SBEZ and the former by specialist activities in Pattani (as a centre for halal food as well as a base for specialised resort tourism targeting the Middle East market) and Yala as an agricultural centre with close links with halal food. Narathiwat meanwhile can act as a service centre for the anticipated growth in cross border trade. Improvements in logistical services along the border, together with new cross border industries within the SBEZ, would be a key feature of the area in addition to the land-bridge.

A3.7 Infrastructure Support Framework

The report of ADB and NESDB (2008) also suggested the infrastructure development program to support the southern seaboard development project. This framework aims to improve the region's competitiveness. These cover ports, roads, rail, and airports.

A3.7.1 Ports

In the future, the following should be undertaken to support seaport development in South Thailand:

- **Limit new ports**. The government should set out a strategic plan for port development in the region. It should focus on two aspects: (i) identifying key locations for new seaports (bulk and containers), and (ii) revitalizing existing ports. In the future, new seaports should be linked only with economic benefits to a larger community such as support to an industrial cluster. If this does not occur, seaports should not be permitted. In addition, plans for developing new cargo ports should only be accepted if the developer is able to bring shipping lines to the project.
- **Use ports as development stimulators**. Since ports will be developed in a more strategic manner in the future, they should also become more multi-purpose. Where possible, ports should be both container and general cargo and should incorporate cold storage, warehousing, break-bulk facilities etc, as well as link directly with economic zones or areas. Seaports have the potential of stimulating further economic development in a region. However, it is important to make sure that any new or expansion of existing seaports has call commitments from shipping lines (through MOUs), before construction is started.
- **Encourage the integration of ports with supporting infrastructure.** To allow the region to become competitive with Bangkok, it has to: (i) develop economies of scale around its industrial sector bases, (ii) integrate and upgrade its seaports, roads, airports, and rail connections and access to the hinterland, (iii) improve its e-technology for customs, and (iv) reduce its costs to the customer. This means that all future transportation planning for South Thailand must always keep this as its first priority.

A3.7.2 Road Network

The strategic development plan for highways in South Thailand should be revised to support the specific needs of industrial clusters, as well as being properly integrated with rail, seaport and air linkages. Recommendations include:

- **Revise the transport network.** A re-assessment of the transport network in South Thailand to respond directly to future industrial cluster development will need to be undertaken. The purpose is to examine the transportation system in a pro-active manner. Prioritized infrastructure projects should be undertaken rather than piecemeal development.
- **Upgrade and link road infrastructure with areas of economic growth.** It will be important to improve capacity and upgrade the road network in a strategic manner in order to better link the highway system with new growth areas, as well as, with existing and future airports, rail corridors, and seaports.
- **Road projects should be prioritized.** Road projects should be prioritized and funded according to their economic benefit to the community and to the need of the industrial cluster.

A3.7.3 Rail Transport

It will be important to reassess the rail network in South Thailand to support increased industrial development, clusters, and tourism. Recommendations include:

- **Re-examine the rail network in the region.** With new industry clusters and comprehensive development areas proposed, the rail network should be re-examined to see how it could best support and facilitate economic growth in the region. The intent is to try to improve the modal split and shift from road to rail and to increase track capacity to better support ports, airports, and cluster development, as well as, improve safety. Ideally, a fast train from Bangkok to new tourism and leisure hubs should be contemplated.
- **Prioritize infrastructure investment.** Rail infrastructure projects should be prioritized. The container yard proposed for Chumphon, which has a proposed budget of 81 million baht, should be put on hold until the industrial growth in the region occurs and there is a need for a container yard. When and if that need arises, the location of the yard should be strategically identified so that it can be integrated with other modes of transportation and can act as a regional inland container depot. If a land-bridge is developed, an inland container depot may be more appropriate in this area (i.e. around Songkhla). Portions of the rail line in South Thailand should be upgraded to a dual track system to support rapid transit to strategic development areas.
- **Where appropriate, provide rail spurs into seaports, industrial estates and industrial clusters to add-value.** To reduce transport costs and support a seamless, integrated transportation network, it will be important to promote rail spurs and direct connectivity from large-scale infrastructure such as seaports to investment and cluster locations and/or in the future to major tourism hubs.
- **Separate the passenger and cargo operations.** To be competitive with neighbouring countries, it may be advantageous to separate the management of the passenger and cargo operations. This would allow for greater efficiencies.

- **Improve network linkages and customs with neighboring countries.** It is anticipated that cross border trade will increase with the development of the growth areas in the region. Attention should be paid to improving linkages with Malaysia and Indonesia and further streamlining and harmonize the processes to remove all administrative barriers currently in existence.

A3.7.4 Airports

To support the development of the region, the following should be undertaken:

- **A strategic plan for regional airports should be prepared.** It is imperative that airports in the region are sustainable. Hence, lessons should be learned from the Chumphon airport. In order to safeguard future problems at other airports, a comprehensive review of the airports in the region should occur and a strategic development plan should be produced to mutually support airport and regional growth.
- **Airports in the region should plan to support economic development by providing enabling infrastructure.** In the future, the airports in the region should be strategically linked into the development plans within the region including neighbouring countries to further promote investment and tourism opportunities. Hence, if there is a need for air cargo or cold storage at an airport to support the local cluster, then this should be a priority so the infrastructure meets the demands of the region.
- **Flight routes should be re-aligned to support tourism needs.** With the strengthening of the tourism sector and an increase of tourism locations and cross-border activities, the flight routes, which connect tourism locations on the east and west coasts, as well as, with neighbouring countries should be re-assessed and re-aligned in some cases, to better support tourism. These routes should be heavily marketed to increase demand in order to support short flights for the airlines.

The report (ADB and NESDB, 2008) suggests the priority needs. A list of key infrastructure project that should be prioritized (some as short-term projects and some for possible longer-term implementation) are as follows:

- Comprehensive development of the land bridge-seaport project between Satun and Songhkla. This should be a comprehensive development area and special economic zone to optimize development opportunities in the region;
- Development of a fast train from Bangkok to South Thailand (with a Surat Thani spur to Phuket and Krabi in the longer term) pending feasibility studies;
- Development of an integrated infrastructure and utilities plan in the region to support new sectors and activities, as well as, increased industrial demand;
- Develop new ferry routes along the West Coast tourism and leisure corridor;
- Develop energy plan for medium and long-term growth of the steel and petroleum clusters;
- Develop a master plan for the upgrading of telecom infrastructure in the Phuket region;
- Develop water infrastructure to support key clusters;
- Develop an integrated airport master plan.

Finally, the report also stresses the importance of public participation. The recommendations for public participation are:

- A design study is needed to develop the details of the public participation framework in planning. It should be done in a participatory manner. It needs to consider a number of key factors including: policy, institutional framework, principles, strategies, processes and operational procedures.
- The framework should include the following key aspects:
  - Appropriate consultation processes that reach out to all stakeholders;
  - Multi-sector planning committees at each level of development;
  - Clear communication strategies and mechanisms such as websites that are transparent;
  - Formal approach and decision-making process that is recognized and accepted by all stakeholders;
  - An arbitration process to resolve disagreements between stakeholders.
- The strategies for the framework should include:
  - Policy statement with agreed upon principles, definitions of public participation and its various components such as information, consultation, negotiation and delegation;
  - Operational guidelines for implementing public participation;
  - Monitoring and quality assurance guidelines;
  - Implementation action plans with activities, timelines, responsible parties and budgets clearly identified.

- Training is recommended on public participation in planning for all stakeholders including government, community, civil society, private sector and media.

MEKONG-INDO ECONOMIC CORRIDOR AND SOUTHERN SEABOARD DEVELOPMENT PROJECT

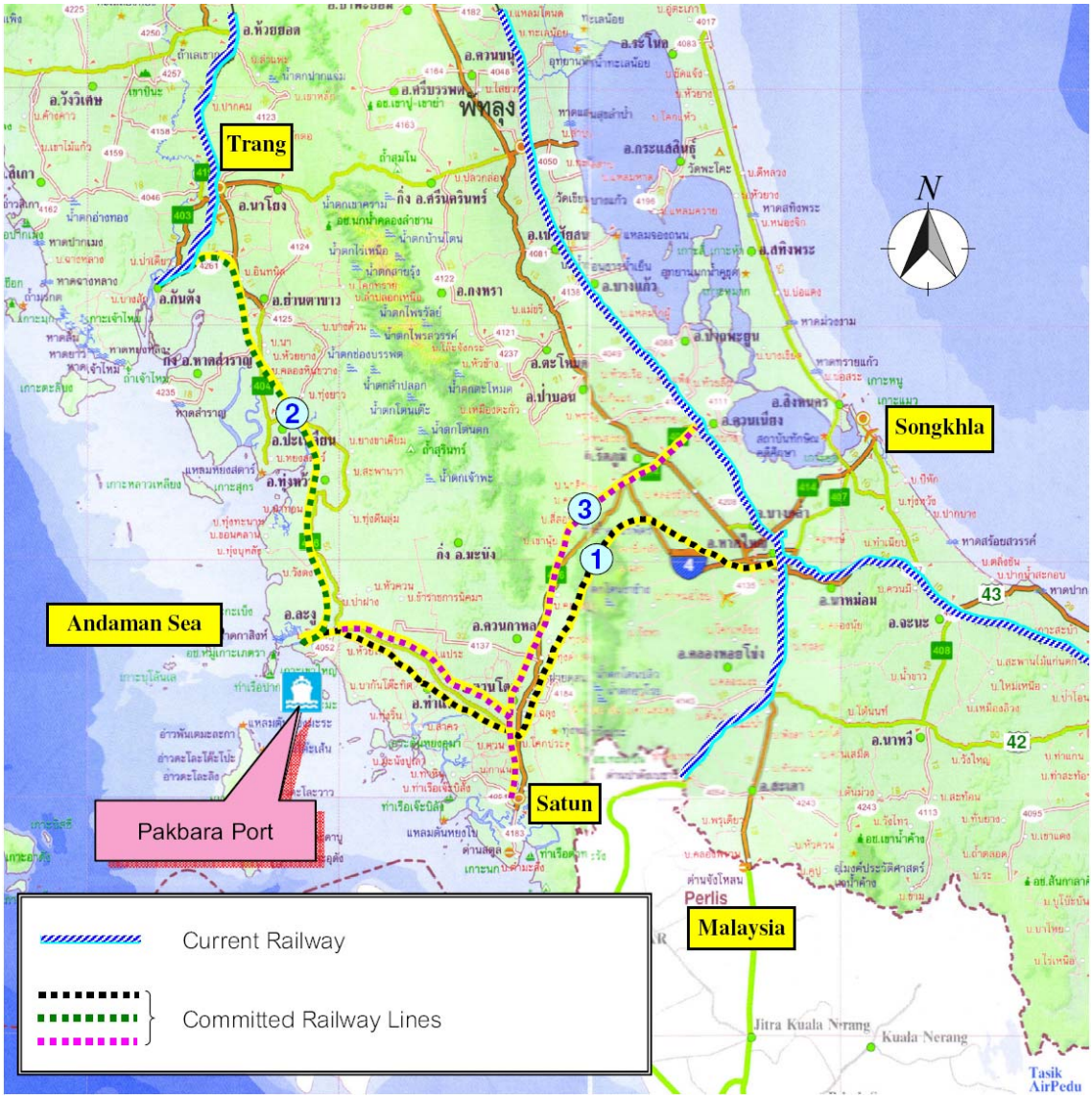
A3.8 MIEC and Southern Seaboard Development Project

The possible connection between Mekong-Indo Economic Corridor (MIEC) and the Southern Seaboard Development Project (SSBD) is that SSBD offered an alternative route to the Andaman Sea for the MIEC.

The under-develop part of the Southern Corridor from Dawei-Bangkok-Phnom Penh-Ho Chi Minh City is the part from Thailand border to Dawei in Myanmar. However, ADB also identified in the GMS Transport Sector Strategy that there is a possible extension of the new corridor from Bangkok to the southern part of Thailand. As we discussed in previous section about the Land-Bridge project of the SSBD, the new corridor can easily integrate with the Land-Bridge between Satun and Songkhla.

Recently, the Ministry of Transport conducted a study on the possible trade lane on the North-South corridor, from Chiang Saen – Chiang Khong to Pak Bara port (TransConsult, 2009). It described the transport infrastructure development along the corridor which partially overlaps on the Bangkok – Pak Bara port corridor. The transport link between Bangkok and Pak Bara Port starts from Bangkok along Highway No. 4 through Provinces of Prachuab Khirikhan, Chumphon enter Highway No. 41 through Provinces of Nakhon Si Thammarat, Phatthalung enter Highway No. 4 at Rattaphumi District, Songkhla Province from their use Highway No. 406 until Satun Province, total distance around 970 kilometers. Presently, Department of Highways has developed and upgraded highway networks to support transportation of Thailand by implementing construction project main road to 4 lanes (Phase 1), which has completed construction total distance around 1,890 kilometers, comprising North Region distance: 650 kilometers and South Region distance: 870 kilometers. This project covers mostly the Highway No. 4. This can be seen that the transport link between Bangkok and Pak Bara via road transport is well connected.

Map A3.2 Rail - track extension corridor linking railway with Pak Bara Port



Source: TransConsults (2009)

The railway connection to Pak Bara port is a bit of problem. The main railway line to the Southern part of Thailand aligns on the East coast to Sonkhla. The State Railway of Thailand (SRT) has projects to expand access routes to Pakbara Port area. It has laid out 3 preliminary approaches as follows:

1. **Hatyai-Satun Corridor Approach:** Starts from Station Junction Hat Yai through intersection between Highway No. 43 and Highway No. 4 from there cut straight to Rattaphume District and parallel with Highway No. 406 to Satun Province, total distance: 130 km.
2. **Trang-Pakbara Corridor Approach:** Starts from rail station in Trang Province area skirting Highway No. 404 and Highway No. 416 (some cutting across back and forth between the 2 highways) ending at Pakbara Port, total distance: 100 km.
3. **Khuan Niang-Satun-Pakbara Corridor Approach:** Split by train Bangkok-Hat Yai line at Station in Kuan Niang District skirting Highway No. 406 and Highway No. 416 to Pakbara Port, total distance: 110 km. There will be an exit to Satun City also.

The rail link between Pak Bara and railway in Songkhla is in line with the proposal of Land-Bridge of SSBD. In this case the possible link that should be promoted is the Hat Yai-Satun corridor approach.

We see that the transport link between the MIEC and SSBD can be promoted as Thai's Government has an idea of linking the Bangkok and the Southern part. However, the success of the corridor development cannot be complete only with public sector. The private participation is also very important in this context.

A3.9 Role of Public Private Partnerships (PPP)

As discussed in ERIA report, the public private partnerships can be a successful factor in this context. One possibility for the PPP project is the multimodal logistics centre along the designated corridors. Vienna Consult (2008) gives an interesting practice for the PPP model as follows.

The region of Graz is one of the biggest economic areas in the South of Austria. The Cargo Centre Graz/Werndorf (CCG-terminal), which is situated in the South of Graz, is integrated into a network of block trains with central, north- and north-western Europe. CCG also connects Austria, particularly Graz, with the new EU member state Hungary and Slovenia as well as South-Eastern European states through modern block train services.

The rail operator for the terminal is the Styrian Railways Company which also has a license to operate throughout Austria. The access to the terminal is open according to the access conditions of the CCG (operating conditions and infrastructure usage charges).

Having the advantage of a direct connection to the rail and road networks, the CCG terminal is the perfect logistic hub for container, swap bodies and trailer traffic. The company's aim is to offer its customers an efficient logistic network of rail and road connections by using the latest IT-developments on the logistics sector including tracking and tracing and proactive customer information. The range of services comprises logistic consulting as well as the organization of pick-up and delivery services.

Services offered at the terminal:

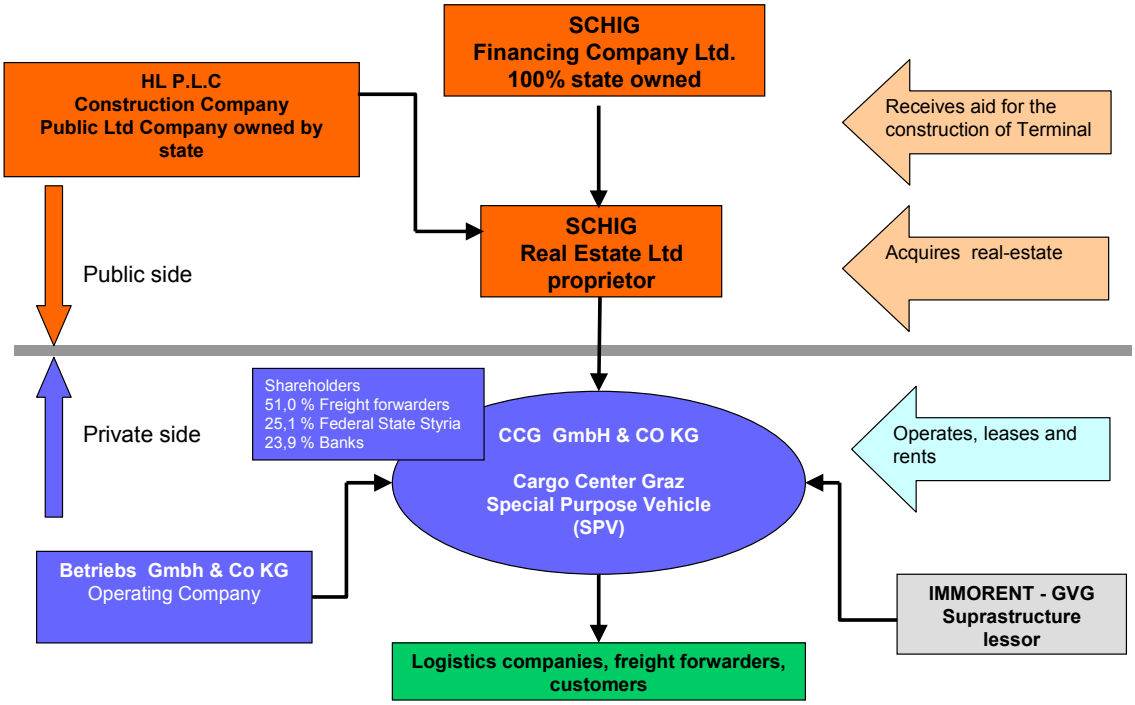
- Customs office
- Depot for empty containers for shipping companies
- Maintenance and repair service for containers of shipping companies
- Agency for operators
- Organization of pick-up and delivery services
- Rental of offices, halls and uncovered areas
- Logistics consulting

The CCG terminal was inaugurated in June 2003. The gantry trains presently take four minutes per lift (15 lifts per hour). When running at high capacity, 20-25 lifts per hour can be achieved. A gantry train reaches its breakeven point with 40,000 lifts per year.

The overall costs of 110 million Euros include investments in the rail infrastructure of approx. 67 million Euros and about 43 million Euros for hall and operating equipment. As a result of the good co-operation between public and private partners, the costs for the infrastructure could be reduced from the originally estimated 79 million Euros to 67 million Euros.

Cargo Centre Graz was the first public private partnership model for terminals in Austria. Figure 5.2 illustrates the main structure of the CCG:

Figure A3..1 The Structure of CCG



Source: Vienna Consult (2008)

The SCHIG (Schieneninfrastrukturgesellschaft) is a financing company, 100% owned by the Federal State of Austria, the aim of which is to finance all rail-bound infrastructure projects. SCHIG finances the public sector contribution.

For practical purposes, SCHIG has founded a real estate limited company the aim of which is to acquire the real estate. HL P.L.C. is a 100% state-owned company (Eisenbahn-Hochleistungsstrecken AG) the aim of which is to plan and construct (by means of subcontracting) important rail infrastructure projects. Due to the existence of the HL P.L.C., the state-owned Austrian Federal Railways do not get involved directly in the construction of new lines or new terminals. HL P.L.C. is in charge of constructing the infrastructure of the CCG using renowned construction companies as its subcontractors.

The CCG GmbH & Co KG is the core of the P.P.P. model. For taxation reasons, it is a limited partnership company (KG) where a company with limited liability (GmbH) is the partner with unlimited liability. Its partners are banks, the State of Styria and four regional freight forwarders.

Since the CCG, for reasons of risk evaluation, does not wish to invest its capital into the construction of the superstructure, an asset leasing company Immorent is the lessor of the superstructure.

For reasons of risk separation, CCG has founded an operating company (Betriebs-GmbH & Co KG) with the form of a limited liability company to carry out the operations of the terminal, i.e. the handling and movement of goods in the terminal.

The PPP model of CCG could be introduced in Thailand, possibly at the Land Bridge corridor. Furthermore, projects on MIEC could also use this model, especially for the multimodal nodes identified on the corridor.

A3.10 CONCLUSION

Thailand has been actively involved in the economic integration in the East Asia region. There is a great potential that the integration of the GMS will create enormous benefits to each country in GMS. With Thailand being at a more advanced stage of development, the neighboring countries in the GMS can benefit from many economic spillovers through linkages with Thailand.

This report described the development of infrastructure in Thailand and the participation in the GMS initiative. Thailand plays an important role in the transport linkage in the East Asia region, especially in the GMS countries.

The most important aspect of the regional integration is the trade facilitation. In order to get the full potential of the economic integration from the economic corridor, the trade facilitation agreement must be promoted. The CBTA of GMS was signed but the implementation is very slow. The CBTA will be a bottleneck to the economic corridor if we were unable to implement it as quick as possible.

With respect to the MIEC, the Southern Seaboard Development Project can contribute to the MIEC as an alternative gateway to the Andaman Sea. However, a number of priorities projects still need to be introduced in order to make the corridor functioning properly.

Endnotes

1. Note: Ten ASEAN countries + six countries - People's Republic of China, Republic of India, Japan, the Republic of Korea, Australia and New Zealand
2. ADB, "GMS Flagship Initiative: East-West Economic Corridor", 2005
3. Note: A Comprehensive Development Zone (CDZ) is defined as self-sustained area with combination of production units, residential areas, public utilities, logistics, and administrative services. CDZ would include one or more Industrial Estates, Logistic Parks, Free Trade and Warehousing Zones and cover existing settlements/industries and estates/services. A master plan for CDZ shall be prepared which has set of coordinated actions covering aforementioned aspects rather than individual projects
4. Note: It includes provinces of Bangkok, Nakhon Pathom, Pathum Thani, Samut Prakan, Samut Sakhon, Samut Songkhram
5. Note: It comprises of provinces of Chonburi and Rayong Province
6. Note: It also includes parts of province of Kandal
7. Note: It includes provinces of Ho Chi Minh City, Binh Duong and Dong Nai
8. Kimura, F and Kobayashi, I "Why is East Asia Industrial Corridor Needed", ERIA Policy Brief No 2009-01, 2009
9. Board of Investment, Thailand , 1993: 4 out of 11 Industrial Parks are in Prachinburi Province
10. Note: Companies such as Hitachi GST which is second largest hard disk drive manufacturer in world
11. Note: Pathum Thani has a very high concentration of higher education institutions, especially ones in the field of science and technology like Asian Institute of Technology, Bangkok University, Rangsit University, Shinawatra University, Sirindhorn International Institute of Technology, Thammasat University
12. JETRO, "ASEAN Logistic Network Map", 2006
13. UNESCAP, "Container Port Volumes" 2007: Share of container throughput of Ports in MIEC (Bangkok, Laem Chabang, Sihanoukville, Saigon) is almost 90% of total container throughput of Thailand, Cambodia, Vietnam.
14. Note: Based on country-wise container growth rate estimated by UNESCAP
15. International Maritime Organization," Council - 93rd session" 2004
16. Kimura. F, "Developing a Roadmap Toward East Asian Economic Integration"; ERIA, 2008
17. Kimura. F, "Developing a Roadmap Toward East Asian Economic Integration"; ERIA, 2008
18. Note: UNESCO reports GER at 11% for the year 1999. The GER now can be taken to be in the range of 11-14%.
19. Note: Demographic dividend is a rise in the rate of economic growth due to a rising share of working age people in a population. Given the availability of work and the resulting employment, the rising share of working age population means there is additional production or output per capita rises. This surplus means that resources are available for investments. As a result, growth of economy can accelerate. This usually occurs late in the demographic transition when the fertility rate falls and the youth dependency rate declines. It is often argued that high growth of the 'East Asian tigers' i.e. South Korea, Singapore, Hong Kong, and Taiwan came from demographic dividend.
20. Note: A Comprehensive Development Zone (CDZ) is defined as self-sustained area with combination of production units, residential areas, public utilities, logistics, and administrative services. CDZ would include one or more Industrial Estates, Logistic Parks, Free Trade and Warehousing Zones and cover existing settlements/industries and estates/services. A master plan for CDZ shall be prepared which has set of coordinated actions covering aforementioned aspects rather than individual projects
21. Note: Pathum Thani has a very high concentration of higher education institutions, especially ones in the field of science and technology like Asian Institute of Technology, Bangkok University, Rangsit University, Shinawatra University, Sirindhorn International Institute of Technology, Thammasat University
22. Note: Refer to Transport Linkages for detail discussions on Rail (page 13)
23. Note: Road has 65% share in total Container Transportation of Laem Chabang. Source: Laem Chabang Port
24. Note: Refer to Transport Linkages for detail discussions on Logistic Parks (page 17)
25. Note: Refer to Transport Linkages for detail discussions on Roads (page 13)
26. Note: India established many Software Technology Parks like Bangalore, STPI Chennai, STPI Hyderabad, STPI Mangalore, among many others.
27. Note: Light machinery producing electrical machinery, general machinery and its parts and components are main industries.

28. Note: Like Electronic-fuel injection systems, Moulds and Dyes, Jigs and fixtures, Anti-lock Braking Systems, Substrates for Catalytic Converters, etc.
29. Note: Its population is ageing, it relies heavily on imports for meeting its health care needs & plans to establish itself as Healthcare Centre of Asia. Thus growth of Pharma & Biotech Sector will become vital to Thailand.
30. Note: Cluster Research' is identified as key strategy in National Biotechnology Policy Framework 2004-09 of Thailand
31. Note: According to UNESCAP data, 56% of the total population was engaged in agricultural sector in Kanchanaburi, 60% in neighboring Suphanburi
32. Note: GMP: Good manufacturing Practice; and HACCP: Hazard Analysis and Critical Control Point are a systematic preventive approach to food safety and pharmaceutical safety. It addresses various physical, chemical, and biological hazards during the production or processing process as a means of prevention rather than finished product inspection. They are recognized internationally as a logical tool for food safety system and certification.
33. Note: Refer to Transport Linkages for detail discussions on Airports (page 15)
34. Note: For example, a Seafood Processing Park has been developed in Kozhikode in India
35. Note: These training centres will impart training on aspect of fish processing and preservation, fishing methods and gear technology, seamanship, boat building, etc. Many countries have started marine Fisheries Training Centres like India, Fiji Islands, Mauritius, Guinea, etc.
36. Note: There many Agriculture Universities in the world like Punjab Agricultural University, Agricultural University of Athens, Agricultural University of Iceland, Warsaw Agricultural University, China Agricultural University, Hanoi University of Agriculture. India itself has more than 30 Agriculture Universities have been developed in India.
37. Note: Meeting, Incentive, Convention & Events
38. Note: Refer to Transport Linkages for detail discussions on Road (page 13)
39. Note: Plough Machines, Pulley Tuckle, Jacks, Machine Tools for Drilling, Boring
40. Note: Refer to Transport Linkages for detail discussions on Rail (page 13)
41. Note: Refer to Transport Linkages for detail discussions on Rail (page 13)
42. Note: It includes provinces of Can Tho, An Giang, Bạc Liêu, Ben Tre, Ca Mau, Dong Thap, Hau Giang, Kien Giang, Soc Trang, Tien Giang, Tra Vinh, Vĩnh Long
43. Note: Refer to Transport Linkages for detail discussions on Port (page 15)
44. Note: Refer to Transport Linkages for details on Road Link (page 13)
45. Note: Refer to Transport Linkages for detail discussions on Airports (page 15)
46. Note: Refer to Transport Linkages for detail discussions on Road and Rail (page 13)
47. Note: Under implementation and expected to be completed by 2010
48. Note: Already under implementation under assistance from ADB and expected to be completed by 2010
49. Note: This yard will have rail-sidings, marshalling and shunting yard along with single 'Joint' customs-immigration-quarantine (CIQ) station wherein cargo and passenger can be transferred between countries
50. Note: For the purpose of this study, the detailed analysis and proposals on 'soft' aspects like air services, freedom rights, bilateral air service agreements, are not covered under the study
51. Note: Knowledge city is envisioned as a community of institutions that serve the diverse range of educational needs from early childhood education to post-graduate study. It will provide land or built-up spaces for multiple educational institutes, business schools, academic services and support providers, professional training centres, research institutions and shall also house facilities for students including hostels, health and sports, medical and hospitality. It will also have requisite residential, commercial and recreational facilities to meet needs of student, teacher. The knowledge city is akin to educational cluster or university campuses like Oxford, Cambridge, and National University of Singapore. Unlike these, knowledge cities are specially planned, with all requisite facilities. Key examples of such knowledge city are Dubai Knowledge Village, Qatar Education City near Doha, King Abdullah University of Science & Technology at Jeddah.
52. Note: Provincial data for Myanmar is not available.
53. International Atomic Energy Agency, "Programme of Action for Cancer Therapy (PACT)", 2007, accessed at http://cancer.iaea.org/newsstory.asp?id=26
54. Lutheran World Federation, Locations of Projects, 2009 accessed at http://www.lwfcam.org.kh/index.php?page=map_of_projects

55. Note: These are indicative location and size of the projects. The detailed feasibility & project report will need to be prepared to identify the site and size of the projects

56. Cambodia Renewable Energy and Rural Electrification, 2007, accessed at http://www.recambodia.org/energoverview.htm

57. NEDO International Projects, 2008, accessed at http://www.nedo.go.jp/ kankobutsu/pamphlets/kokusai/nedo_english2008_3.pdf

58. World Bank, Issue Paper: Cambodia Energy Sector Strategy Review, 2006

59. Institute of Energy, Vietnam

60. Note: The Geographical Simulation Model (GSM) aims to focus on the geographical structure of the regional economy, mainly from the viewpoint of spatial economics. It focuses on the relationship between economic integration and regional economy at sub-national level. The GSM is designed to predict the effects of the regional economic integration, especially the development of transport infrastructure and reduction in "border costs", and fits very well in the ERIA infrastructure project.

61. Note: Special Purpose Vehicles could be (i) entirely private sector entities, (ii) entities with joint-venture between public and private, or (iii) purely public sector entities, depending upon the type of projects being implemented.

62. Note: SDDA would essentially be a multi-faceted organization responsible for planning, coordination, and implementation of suggested action plans/projects (including associated managerial support and funding) and other activities related to development of corridor. It would take the 'ownership' of program and work independently from development agenda of governments in corridor.

63. Note: PMC shall be a consultant who as program manager shall work under the aegis of SDDA to provide necessary advisory assistance with respect to the project preparation, development, financing and implementation.

64. Note: VGF is a mechanism under which a lumpsum payment by Government is made to support PPP projects which eventually enhances the commercial viability of the projects. An infrastructure project may not be commercially viable for private sector to invest but have high economic benefit. In order to promote development of such projects through private sector particiaption, a financial support is generally given in form of grants (as percentage of total project cost). This reduces the capital cost for private sector thus making the project more attractive.

65. Note: "Program" means planning and development of "Mekong India-Economic Corridor (MIEC)" comprising of various projects viz. Industrial Corridors, development of expressways, other infrastructure projects and other activities as proposed in this concept paper

66. Kumagai, Satoru; Gokan, Toshitaka; Isono, Ikumo; and Keola, Souknilanh. (2008) "Predicting Long-term Effects of Infrastructure Development Projects in Continental South East Asia: IDE Geographical Simulation Model." ERIA Discussion Paper Series ERIA-DP-2008-02. Available at http://www.eria.org

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