



Technical Assistance Consultant's Report

Project Number: 50184-001
February 2020

Democratic Socialist Republic of Sri Lanka: National Port Master Plan (Financed by the Japan Fund for Poverty Reduction) The National Port Directions – Volume 1 (Part 1)

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Asian Development Bank



National Port Master Plan – Volume 1

National Port Directions

March 2019



Sri Lanka Ports Authority



Japan
Fund for
Poverty
Reduction



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document title	National Port Directions – Volume 1
document status	Final
date	March 2019
project name	National Port Master Plan
MTBS reference	825 953
client	Asian Development Bank
executing agency	Sri Lanka Ports Authority
client reference	Technical assistance for National Port Master Plan

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Index

Preface	5
Executive Summary	7
Government National Export Vision	8
Strategic Directions on Ports	9
International Competitive Position	15
Sri Lanka Ports and their functions	25
Port of Colombo	27
Port of Trincomalee	31
Port of Hambantota	34
Port of Galle	37
Kankesanthurai (KKS)	38
Oluvil	40
Puttalam Coal Jetty	40
Demand analysis for the port Sector	41
Port development plans and Short Term Priority Projects	58
Recommendations on other matters	81
PART A: Description Sri Lanka Ports and External Environment	92
1 Introduction	93
1.1 Background	93
1.2 Objective	93
1.3 Structure of the report	94
2 Port Sector Directions	95
2.1 Introduction	95
2.2 Government National Export Vision on Sri Lanka	95
2.3 Strategic Directions on Ports	97
2.4 Strategic tasks	107
2.5 International environment	113
3 Sri Lankan Ports and Their functions	137
3.1 Introduction	137
3.2 Port Sector Overview	137
3.3 Port of Colombo	140
3.4 Port of Trincomalee	148
3.5 Port of Hambantota	151
3.6 Port of Galle	155
3.7 Kankesanthurai (KKS)	157
3.8 Oluvil	158
3.9 Puttalam Coal Jetty	159
PART B: Demand Analysis & Port Development Directions	160
4 Demand analysis for the Port Sector	161

4.1	Introduction	161
4.2	National trade and production	161
4.3	Forecast on Commodities	168
4.4	Commodity-Level Allocation	187
4.5	Capacity development needs	196
5	Port Development Directions	205
5.1	Introduction	205
5.2	Colombo port directions	205
5.3	Port of Trincomalee port directions	218
5.4	Port of Hambantota port directions	232
5.5	Galle Port Directions	238
5.6	Kankesanthurai Port Directions	242
5.7	Oluvil Port Directions	245
5.8	Puttalam	247
	PART C: Port Connectivity & Logistics Hubs	250
6	National Port Connectivity	251
6.1	Introduction	251
6.2	Port Connectivity Projects	251
6.3	National Roads	252
6.4	National Railways	258
6.5	Coastal shipping	262
6.6	Inland waterways	265
7	Logistics hubs with Dry Ports & Corridors	269
7.1	Introduction	269
7.2	International best practice	269
7.3	Current situation	275
7.4	Sri Lanka Integrated Logistics Hubs – Dry Port – FTZ – Corridor development	276
7.5	Colombo – Trincomalee Economic Corridor	283
	PART D: Innovation, Technological Developments & Trade Facilitation	294
8	Technology and Port Community Systems	295
8.1	Introduction	295
8.2	International best practice	295
8.3	Current situation	302
8.4	IT Way Forward	308
8.5	Recommendations	310
9	Warehousing	313
9.1	Introduction	313
9.2	International best practices	313
9.3	Current Situation	316
9.4	Warehouse Demand	318
9.5	Recommendations	319
10	Trade Facilitation	321
10.1	Introduction	321

10.2	Current situation Sri Lanka	321
10.3	International benchmarks	326
10.4	Recommendations and Way Forward	332
11	Customs	333
11.1	Introduction	333
11.2	International best practice	333
11.3	Current situation	338
11.4	Recommendations	347
12	Navy	351
12.1	Introduction	351
12.2	Current situation	351
12.3	Recommendations	352
13	Auxiliary Port Functions	353
13.1	Introduction	353
13.2	International best practice	353
13.3	Current situation	358
13.4	Direct Supportive Functions	359
13.5	Indirect Supportive Functions	366
13.6	Way Forward SLPA and Auxiliary Functions	376
Appendix I TOR Overview		377
Appendix II Questionnaire Form		378
Appendix III Questionnaire Results		380
Appendix IV Commodity Assessment and Forecast Assumptions		383
Appendix V General Forecasting Methodology		396
Appendix VI Container Transshipment Forecasting Methodology		400
Appendix VII Summary of Sri Lanka Ports Authority Act		416
Appendix VIII Labour force		430
Appendix IX Feedback from Stakeholders Workshop		431
Appendix X Road map for logistics		432
Appendix XI IMO conventions and ratifications		433

Preface

National Port Master Plan

On the 30th of November 2016, the Asian Development Bank (ADB) and Maritime & Transport Business Solutions B.V. (MTBS; representing the Consultant) signed the contract for the development of a National Port Master Plan for Sri Lanka (ADB reference 50184-001).

The National Port Master Plan (NPMP) consists of the following reports:

- A. Executive Summary
- B. The National Port Directions - Volume 1;
- C. The Colombo Port Development Plan – Volume 2;
- D. The Trincomalee Port Development Plan – Volume 3;
- E. Passenger Terminal Concept Report – Volumes 4;
- F. Pre-Feasibility Study for deepening JCT Terminal for Operating Larger Container vessels – Volumes 5; and
- G. Port Elevated High Way – Volume 6; and
- H. Port Reform – Volume 7.

National Port Directions

The National Port Directions report (this report) consist of the following deliveries:

- A. Draft National Port Directions; and
- B. National Port Directions.

The objective of the NPD is to identify the development needs of the Sri Lankan national ports both in terms of physical infrastructure needs and port governance needs. The needs assessments lead to specific policy measures and development plans. For this purpose, quantitative and qualitative assessments of the current port environment and the future needs are made. This report builds upon several policy documents of the government and SLPA, national development plans, port development plans and studies by different bodies.

Reading Guide

Part A: Description Sri Lankan Ports and Environment

The current situation is important sketch to understand the dynamics in play when assessing the ports. The ports of Colombo, Trincomalee, Hambantota, Galle, Kankesanthurai and Oluvil are the main ports described. The external port environment refers to the national economy and trade and the international competitive setting.

Part B: National Cargo Forecast and Port Directions

The quantitative analysis on the demand analysis for the port sector and the forecast on each of the commodities are described. The Base Case and High Case for containers on transshipment is provided and capacity analyses followed by a gap analysis and the port allocations strategy which leads to the port development needs. The port directions include the observations and recommendations leading to the short or long-term priority projects in each port. The port development plan is displayed for each on the ports under investigation.

Part C: Port Connectivity and Logistics Hubs

This part contains the review for port connectivity. The national road and rail in relationship to the ports are discussed and recommendations provided. Coastal shipping and inland waterways are described and the recommendations for development are described. A large section is assigned to the Logistics hub and corridor development. First, the international perspective is provided and there after the current situation is described. Finally, the reviews of logistics hubs and corridor development are made and recommendations provided.

Part D: Innovation, Technological developments and trade facilitation

Innovation on IT and systems, technological developments such as a port community system are essential improvements for the port sector. Further enhancements on Customs procedures and implementation of trade facilitation for the Logistics hubs and EPZ are important milestones to attract FDI for the new export strategy. Furthermore, the Navy and the auxiliary functions and the recommendations thereto are described.

Executive Summary

Reading guide summary	Explanation
Government National Export Vision	National Export Strategy and Vision
Strategic Directions on ports	Port Vision and Mission Four Strategies 21 strategic directions & Tasks
International Competitive Position	International trade growth slows down China's role is slowing down India emerging role? Increased vessel sizes and cascading Alliances and consolidation Changing management models in Ports Technical changes in the maritime shipping industry Digitalisation in the port industry International Port Competition
Sri Lanka Ports and their functions	Description of existing ports Current usage on cargo functions, gateway volumes and ship arrivals for the nation Per port: General overview, Hinterland connectivity, cargot traffic and marine traffic
Demand analysis for the port sector	Macro Economic overview, trade and production, Tourism & Cruise Forecast on Commodities: Containers (Gateway and Transshipment), Dry Bulk, Liquid Bulk, LNG, Breakbulk, RoRo. Cargo allocation strategy Gap analysis and Development needs per commodity
Port Development plans and short term priority projects	Port directions Port forecasts Priority projects Development plans
Recommendations on other topics	National Road Connectivity National Rail Connectivity Coastal shipping transportation Inlandwaterways passenger transportation Logistics Hubs – Dry Port – FTZ Colombo – Tricomalee Economic Corridor IT and Port Community systems Warehousing by SLPA Trade Facilitation Customs Navy Auxiliary Functions

Government National Export Vision

The National Export Strategy (NES) document published in December 2017 highlighted that the nations export sector needs to be reshaped and transformed. In alignment with the vision 2025 and the National Trade Policy the NES aims to simulate growth and job creation by improving the ability of firms to export and compete in foreign markets. Current obstacles need to be dissolved and “things need to be done differently” to increase the contribution of trade to economic development according to the document. Economic reforms for a more flexible business environment combined with increasing regional trade opportunities and major transformations in production techniques provide a unique window of opportunity for Sri Lanka to modernise and start a new cycle of export growth.

It was clearly addressed that Sri Lanka should realize its full potential as regional trade hub taking the opportunity to catch up to fast growing Asian export countries. Sri Lanka centrally located on major trade routes between Asia and Europe, Middle East, Bay of Bengal, and Africa is well positioned to participate in global production networks serving large consumers markets. The focus should be at new exports beyond today’s exports which rely on a blend of traditional industries of apparel, tea, gems and rubber. To create the new export environment high tariffs, complicated administrative procedures and challenging access to inputs will be addressed to favour growth of high technology and knowledge intensive exports.

The National Vision is there for defined as:

“Sri Lanka – an export hub driven by innovation and investment”.

There are four strategic objectives:

1. To have a business-enabling, predictable and transparent policy and regulatory framework that support exports.
2. To strengthen Sri Lankan exporters’ market entry and compliance capacities
3. To become an efficient trade and logistics hub to facilitate exports
4. To drive export diversification through innovation and by strengthening emerging export sectors

The following six focus sectors have been identified under the NES and the role of ports has been added:

Focus sector	Type of Industry	Growth trend	Ports involvement
IT-BPM	Services	Mature	High (container traffic)
Wellness / tourism	Services	Emerging	Medium (cruise)
Spices and concentrates	Agriculture	Mature	High (air and shipping traffic)
Boating industry	Manufacturing	Visionary	High (marina’s and boat yards)
Processed foods and beverages	Agriculture	Emerging	High (container traffic)
Electrical and electronic components (EEC)	Manufacturing	Visionary	High (container traffic)

The following picture shows the NES strategy schematically.



Source: Sri Lanka National Export strategy

Strategic Directions on Ports

The ports of Sri Lanka play a vital role in the implementation of this strategy. As an island, all what is consumed is imported or exported goes through nations ports. Without proper functioning of the ports, the import of raw materials and the exports of half fabricates, or final products is hampered, and the export strategy may fail. Hence the need for modern and effective ports. This implies creating more efficient ports by upgrading port infrastructure, creating more efficiency by modern handling techniques and reducing the administration paper works by innovative systems. Additionally, the ports should be connected to dry ports which facilitates the newly attracted export processing activities. Most of the focus sectors as mentioned in the NES, translates to the flow of containers through Sri Lankan ports. It therefor that this segment should get prime focus in line with the logistic hub concept and the excellent geographical location Sri Lanka has on the containerized trades. Next to facilitating trade, the ports sector is an area at which new industries can settle. Especially medium to heavy industries are best located near the ports where logistical advantage can be obtained in the supply of raw materials. In this respect ports and their industry play a vital role in the energy consumption of the country both for power stations, refineries, and industry as well as for imports for consumer markets like refined products such as petrol, gasoline and kerosene. Ports also play a vital role for the food consumption/processing in the country and for the construction sectors. With increased wealth of citizens is it also expected that the roro sector of imported cars will boost. Ports have a role in the tourism sector. Many Sri Lankan ports and cities are worthwhile to visit and to start or end wildlife and or cultural excursions. The cruise industry has discovered the island already, but the industry is only at an “early entrance” stage. Marina’s and boat yards are common features when the “boating industry” visionary export sector is developed. Finally,

the port of Colombo should improve its status as maritime city attracting maritime businesses to a lively and vibrant City.

A combination of the National Export Strategy and the excellent position as transshipment hub are highlighted in the National Ports Sector Vision.

Ports vision:

“Sri Lanka will have leading ports in the Indian Ocean, Middle East and East African whilst developing the Nation through new networks of efficient logistic corridors to support development of key import and export sectors”.

This vision statement emphasises that the transshipment hub position on maritime trades is to be maintained and enhanced. It also encompasses that the ports maritime strategy should focus on facilitating logistics efficiently and innovate through applying new technologies. Further the ports should focus on attracting sustainable investments supporting the nation and the national export strategy. Finally, the strategy is to become an international well recognized maritime centre.

A few elements are highlighted in this vision statement:

- **Transshipment hub** – The ports sector will focus on maintaining leadership in the transshipment business by a world class transshipment hub at Colombo, serving the Middle East, East Africa, India, Pakistan and the Bay of Bengal;
- **The Logistics Hub** – The steps towards becoming a logistics hub involves identifying strengths, identifying potential markets and business and attracting those utilising the full capacity of SLPA and the government.
- **Sustainable ports** – The ports in Sri Lanka will become sustainable through sustainable investments and introducing “green” concepts in a safe working environment.
- **Maritime Centre** – The port of Colombo is to become a well recognized international maritime centre, offering services to the maritime industry.



Ports Mission statement:

“SLPA facilitates economic opportunities for Sri Lanka by creating a competitive, knowledge-based and industry-accumulated port environment utilising Sri Lanka’s strategic advantages in the maritime trade.”

This mission statement expresses SLPA’s reason of existence by aligning the organisation’s mission with that of the nation. SLPA ultimately provides the economic gateways to the country in the form of its ports and is thus subject the nation’s greater economic strategy but is also central in the local function for a region.

A few concepts highlighted in this vision and mission statement are:

- **Trade and Economic Opportunities for Sri Lanka** – The ports are the facilitator for the nation’s exports and imports in terms of infrastructure, efficient procedures, investment climate and safety and security.
- **Competitive Port** – Sri Lanka should position their ports competitively in relation to other hub ports. The need is there to promote ports and logistics hubs and as a total concept to the outside world. Port competition is mainly focussed on to achieve maximum value and minimal costs for the country. Constant comparison with global leading ports and direct competitors ensures the organisation is aware of potential improvements.
- **Knowledge Based Port** – Investments in people and technology will ensure sustainable growth.
- **Logistics corridors** – The concept of logistics corridors is applied to facilitate efficient logistics hubs.
- **A role in wealth of the nation** – Each port shall have a function and role to serve the growing wealth of the nation.
- **Accumulated port environment** – Each port will set a growth path for attracting maritime businesses and specifically Port of Colombo is to become a well recognised International Maritime Centre (IMC).

Core Values

The core values whilst striving for the vision and mission are:

“Integrity”, “accountability”, “reliability”, “knowledge-based”, “efficiency”, “transparency”

Although these words are self-explanatory it will require considerable efforts to achieve these core values. Mind-set needs to be changed and training is required to create similar values at all levels throughout the Port Sector.

Management policies

This reflects the main management policies to achieve the core values.

- Harmonising through IT. Key is to utilise modern technologies to change and harmonize the Port Sector. Digitalisation of processes and the introduction of advanced technologies create a “smart port”.
- Demand oriented. Processes should be demand driven with transparent inputs and outputs.
- Institutional reform. Institutional reform is required to align roles and responsibilities in the sector, to create focus and to create a level playing field.
- Safe, secure and sustainable policies. Ports serve the nation and are the backbone of the Society. Port activities should be safe, secured and contribute to an national sustainable agenda.

Strategies

There are five main strategies derived from these vision and mission statements which encompasses the major components of the port vision and the port mission:

1. Transshipment Hub port strategy
2. Logistics Hub strategy
3. Serving the nation economic growth strategy
4. Sustainable development of ports strategy
5. International Maritime Centre Strategy

Transshipment Hub Strategy “One nation”- “One Hub”

This strategy aims on staying a leader of hubs ports in the Indian Ocean. Port of Colombo ranked 23rd on the global container handling ports in 2016 with a total of 5.7 million TEU handled TEU of which 75% was transshipment cargo. It is the main hub port for transshipment in the Indian Ocean. The geographic position of Port of Colombo near the main East West shipping routes is key in maintaining leadership position. The transshipment in Sri Lanka is focussed at a single Port, Port of Colombo, to benefit from centralization and utilise

the capacities which have been designed for it. Centralisation will provide economies of scale and ensure focused investments. As such the shipping community will be able to act jointly to do what has been done already for many years making Port of Colombo a large transshipment hub. Gateway cargo acts as a cornerstone for shipping lines to call at ports and therefore a successful transshipment Hub also should have a significant share on gateway cargo. With ample development space with sufficient water depths and serving the largest consumer markets, the western region, Port of Colombo is to be promoted as National Transshipment port. Multiple ports serving this same transshipment industry would divide the shipping community and will be less efficient for shipping lines which have to serve the western region and like to centralize their operations as much as possible. Although the Port of Colombo has several terminals both in public and private sector, the marketing should be focussed on “One nation” One “Hub”. Coordination, cooperation amongst Port Authority, terminals and the port community are required to make the total system efficient and to promote Sri Lanka as a whole and Port of Colombo specifically as transshipment hub. The aim is to focus on “working together” and “act together”. With a changing environment in the transshipment business with more competition, larger vessels, and more direct trades, the challenges under this strategy are high.

Logistics Hub Strategy “Becoming an intelligent Logistics Hub”

The Logistics Hub strategy is focussed on creating the business environment to attract logistics to designated areas so-called Dry Ports which have proper connections to the ports. The logistics industry should aim at value added activities in the global production chains. Products can be manufactured and re-exported again. Electrical appliances, household goods, and other consumer market products should be strived for. Through connecting the Ports with these Dry Ports through Corridors an efficient network for the exports and imports is created. Digitalisation of the network will support intelligent logistics. The logistics sector will become attractive through establishment offered trade zones and other trade incentives. Together with trade policies and trade agreements, value added logistics can create Sri Lanka as an export driven nation making efficient use of the central geographical location in the Indian Ocean and the ample options of connectivity provided by the container line shipping services.

Serving the nation economic growth strategy “Accelerating the economy”

Ports act as “engine” and as a “front-door” for the economic development of the nation. The front-door should be wide open to ensure efficient cargo flows towards the nation and should pave the way to facilitate new exports. Barriers of congestion are to be removed and ports should contribute to the national growth strategy by focussing on specific trades optimising their individual strength and their role in serving the nation as well as the region. The specific trades such as Liquid Bulk, LNG, Dry Bulk, Containers, RoRo each has their characteristics and investments in port infrastructure should well utilised.

Sustainable development of ports strategy “Green and sustainable”

The sustainable component in this strategy comes from the world class ports taking the direction to contribute to a sustainable port environment. The carbon foot print of ports and their facilities is measured and policy is created to (gradually) reduce the emissions and contribute to a cleaner world. The emphasis is to green the port and the port users gradually. In order to understand the effects measurements and monitoring systems should be implemented. It is noteworthy that some private terminals have already taken this direction by implementing electrical RTG as such reducing the emissions.

International Maritime Centre strategy

The Port of Colombo is to become a well recognized as Maritime Centre, a place in which efficient maritime services are provided and which various trade related services and maritime industries are vested. The strategy is to be developed over time. The development of Port City may act as accelerator to this strategy.

Three main “centres” have been identified:

- Centre of trade sectors:
 - Finance / Insurance / Trading & Arbitration
 - Logistics companies
- Centre for port and shipping industries:
 - Shipping and classification societies;
 - Maintenance and Repair
 - Port Technology
 - Bunkering
- Accumulation of supporting industries
 - Education & Training
 - Research & Development
 - Consultancy

Five strategies lead to 21 strategic directions.

The five strategies are displayed in next table with T (Transshipment Hub Port Strategy), L (logistics Hub strategy), N (serving Nation economic growth strategy), S for the Sustainable strategy and C for International Maritime Centre. For each of the strategies the strategic directions are displayed.

There are 21 strategic directions formulated for the port sector based on the five strategies.

T	L	N	S	C	Strategic directions	Strategic tasks
V				V	Leader in Indian Ocean Hub port	Hub port marketing “One Nation”, “One Hub” Effective ITT Low handling tariffs Efficient auxiliary functions (like bunkering) Excellent nautical services & safety
		V		V	Improve Colombo as Maritime Centre	Profiling and branding Colombo Port Boosting Ease of Doing Business Creating a vibrant business and living environment Facilitate new business opportunities Provide incentives to attract business Partnership with other IMCs
		V		V	Tourism development	Perform Cruise marketing (incl. home port) Create Cruise terminals with PPP Develop Marina’s with PPP
V	V	V	V	V	Supply oriented and timely port development to ensure supply is offered in advance of demand growth	Port Master Planning covering next 30 years with periodic 5 years updates
		V		V	Port investment for primary sectors for the nation and right-fit	Energy sector - Align requirements to port solutions Industry sector – Facilitate existing and new refineries and new industries Fuel supply - Facilitate the growth for fuel supply

T	L	N	S	C	Strategic directions	Strategic tasks
						Food sector – Facilitate grain and fertilisers supply Consumer markets – Facilitate container traffic Construction – Facilitate general cargo and project cargoes Car industry – Facilitate RoRo cargoes
V					New Products and commodities	Facilitate the development of newly traded commodities like Liquid Bulks (LNG and refined), Dry Bulks (Biomass, grains and minerals)
V	V		V		Modernisation of equipment and services	Increase productivity at quays to reduce ship waiting times Invest in new quay and yard equipment Gate automation Workshop systems and support
V	V	V	V	V	Demand oriented	Boost commercial management with focus on PPP
		V			Reform and Self-sustainability	Restructure into business units, commercialize and corporatize (with PPP) Tariff restructuring
V	V		V		Enhance logistics competitiveness	Assign Dry ports with FTZ Modern warehouses and systems
	V		V		Customs efficiencies	Single customs window and risk management
V	V	V		V	Efficiency through digitalisation	Port Community System Digitalisation of information flows, “smart port” technologies Measurements of KPI’s and display at dashboards
	V				Serving dry port developments and connectivity	Connect Port with dry ports efficiently through bonded transport
V	V	V		V	PPP	Enhance port environment with PPP to attract world class operators
V	V	V	V	V	Knowledge and education	Ensure education is modern and appropriate for the maritime and port sector, increase women participation
		V			Green port concept	Introduce measurement systems and execute EIAs in early stages of development Prepare carbon footprint and promote emission reduction schemes Facilitate the change in bunkering requirements

T	L	N	S	C	Strategic directions	Strategic tasks
V	V	V	V	V	Safe and secure working environment	Ports will provide safe and secure working environments according to international standards
V	V	V	V	V	Compliance with IMO and SOLAS	Ensure compliance with latest IMO and SOLAS regulations. For example, ISPS, Ballast Waste Management, VGM, and FAL convention
V	V	V		V	Attracting foreign direct investments	Act as landlord for new industrial and logistics areas near ports and along the corridors Participate in trade facilitation legislation Trade policy development Boosting Ease of Doing Business
	V	V		V	Focus on add value and logistics industries	Newly export oriented industry will require new demand from ports in terms of infrastructure and services levels. The port sector will participate in facilitating requirements.
	V			V	Facilitate global production networks	Participate in defining framework of requirements for new industries

International Competitive Position

The conclusion is that the transshipment market is becoming a more competitive market than in the past. Port developments in the end-feeder markets would allow for larger ships and once volumes arise more **direct lines** are likely to populate the services. Meanwhile **competition on the major hubs** in South East Asia also increases though expansion plans at Singapore, Port Klang and Tanjung Pelepas (Together they plan an additional 38.5 MTEU capacity). Finally, **additional competition within the South Asia Hub** through green field port projects at the Indian coast line like Vizhinjam and Colachel (together 11.4 M TEU planned capacity) will offer competition in future. Uncertainty about Hambantota's role as potential transshipment port is also a policy issue.

Luckily the feeder markets are expected to grow so the entire market is still growing. Transshipment hubs can only survive when they offer timely port development for sufficient water depths and quay lengths for the Ultra Large Container Vessels. Port of Colombo, with ample space in South Port for development, is positioned well to take up the challenge to maintain the leadership in the India Ocean. It will however not be won on infrastructure alone, also port efficiency improvements and innovation are key for offering the best services against the lowest prices, required to maintain leadership in the footloose transshipment market. Sri Lanka can stay ahead of the market by timely port development and efficiency improvements driven by innovation and technological improvements and reducing administrative hurdles.

The international position of ports is changing due to the following external maritime trends:

1. International trade growth slows down
2. China's role is slowing down
3. India emerging role?
4. Increased vessel sizes and cascading
5. Alliances and consolidation
6. Changing management models in Ports
7. Technical changes in the maritime shipping industry

8. Digitalisation in the port industry
9. International Port Competition

The international trade slows down

After strongly rebounding from the 2008 Recession, international trade has grown at a sluggish pace that further deteriorated in 2015 according to statistics from WTO. The world trade volumes remained low at a growth of 2.6% (similar to 2015) and expected to rise by 3.6% in 2016.

Per UNCTAD, a substantial part of the drop in international trade was due to nominal factors, principally the fall in the price of commodities and the overall appreciation of the United States dollar. Weaker demand also played a role, especially in East Asia and in other parts of the developing world. Although the largest decline occurred in commodity sectors, the value of trade also contracted in all manufacturing and agricultural sectors. Declines in the value of trade were also observed in the service sectors. The trade collapse of 2015 affected all geographic regions. In general, trade flows of developing countries registered a sharper downtrend relative to the last trade collapse of 2009. South–South trade performance was also weak, largely driven by lower East Asian imports. In terms of export performance, countries in East Asia generally fared relatively better.

The role of China in feeding maritime trades is slowing down

In particular, China emerging role in international trade cooled down due to slower GDP growth of 6.9% compared to double digits' growth over several years between 1990 and 2010. The centralised economy is slowly focussing more on internal development rather than export focussed resulting in less seaborne trade. China's role in global merchandise trade had become rather dominant with a share in world imports from 1% in 1980s to 10% in 2014 and to 12% share in world exports. The shift in trade flows to/from the East Asia has resulted in the emergence of mega scale ports in Asia. In 2015 9 out of the top 10 ports were from Asia compared to only 4 in 1980. The World Bank outlook for the East Asia and Pacific region is projected to grow at 6.2 % in 2017, and at a slightly lower 6.1 % on average in 2018-19, in line with previous forecasts. A gradual slowdown in China is offsetting a continued modest pickup in the rest of the region, led by a rebound in commodity exporters and a gradual recovery in Thailand. Growth in commodity importers excluding China is projected to remain robust, as stronger exports will offset the negative effects of eventual policy tightening on domestic demand. Downside risks are mainly external. They include heightened policy uncertainty and increased protectionism in key advanced economies, and the risk of an abrupt tightening of global financing conditions. A sharp slowdown in China is a low probability risk, but it would have major negative consequences for the main East West trades on which Sri Lanka performs considerable transshipment volumes today.

India's emerging role is at the door step

The Indian Port strategy is to bring manufacturing areas closer to ports as it has been estimated that India can save upto USD 28 billion in infrastructure investment and another USD 3.3 billion in transportation costs if 50% of overall trade moves closer to ports by 2020. The Indian government plans to develop 10 coastal economic regions as part of plans to revive the country's Sagarmala (string of ports) project. The zones would be converted into manufacturing hubs, supported by port modernisation projects, and could span 300–500 km of the coastline. The government is also looking to develop the inland waterway sector as an alternative to road and rail routes to transport goods to the nation's ports and hopes to attract private investment in the sector.

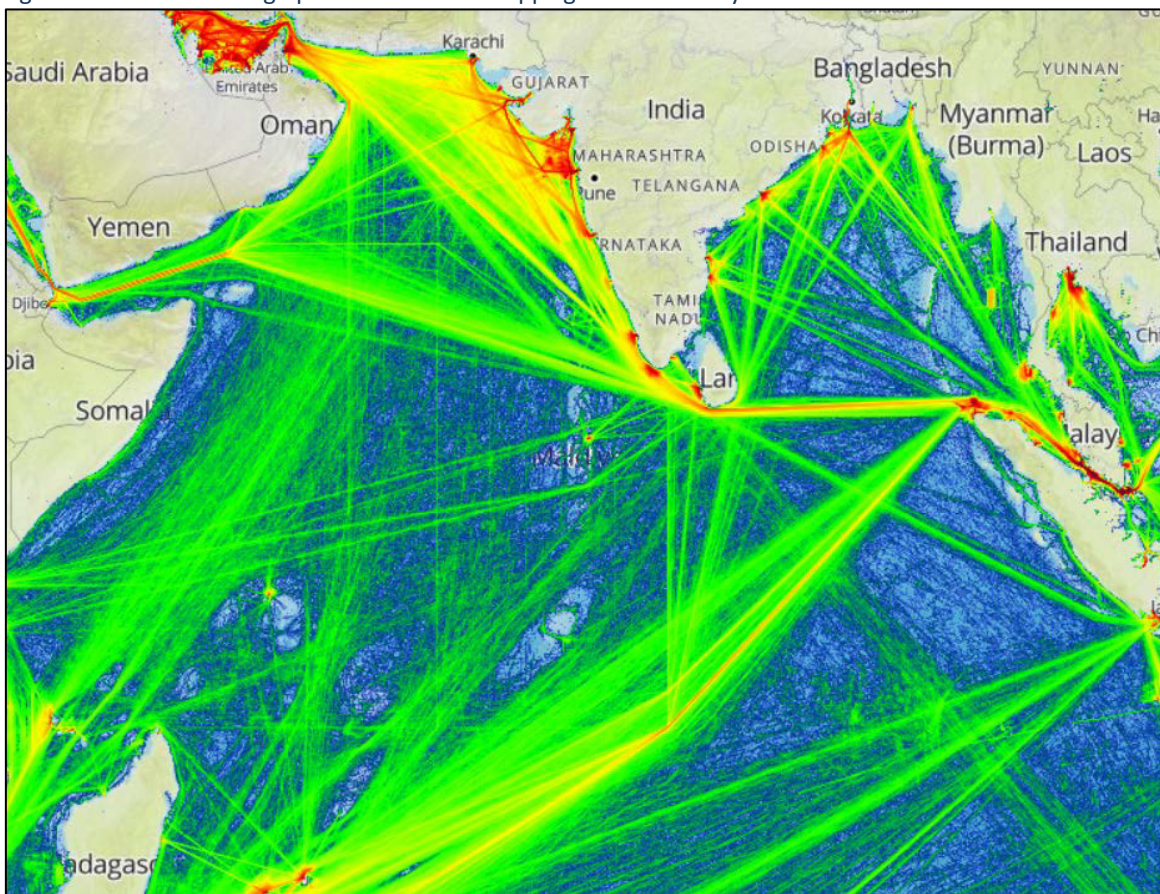
The strategy includes upgrading and expansions of ports with 39 million TEU roughly equally divided for East, West and Southern regions. The conclusion is that India is strongly preparing the port and transport sector to facilitate export growth through new developed industrial zones closer to ports. With respect to coastal shipping the abolishment of cabotage legislation may attract foreign shipowners performing on domestic transshipment

around Indian coast. Due to the existing infrastructure issues and long haul distances to existing production sites it will take time before India's economy becomes a leading economic exporter like China is today.

International Shipping and Transshipment

Transshipment of containers is a core activity at the port of Colombo. Transshipment cargo amounts to approximately 75.0% of all containers handled. In 2015, the port handled about 5.1 M TEU. The transshipment volume of approximately 3.8 M TEU is mainly captured due to the strategic position of the port, proximate to the main East-West Shipping lanes and close to feeder destinations along the Indian coastline and Bay of Bengal. It has adequate water depth and container facilities to handle the largest vessels in the global container trades.

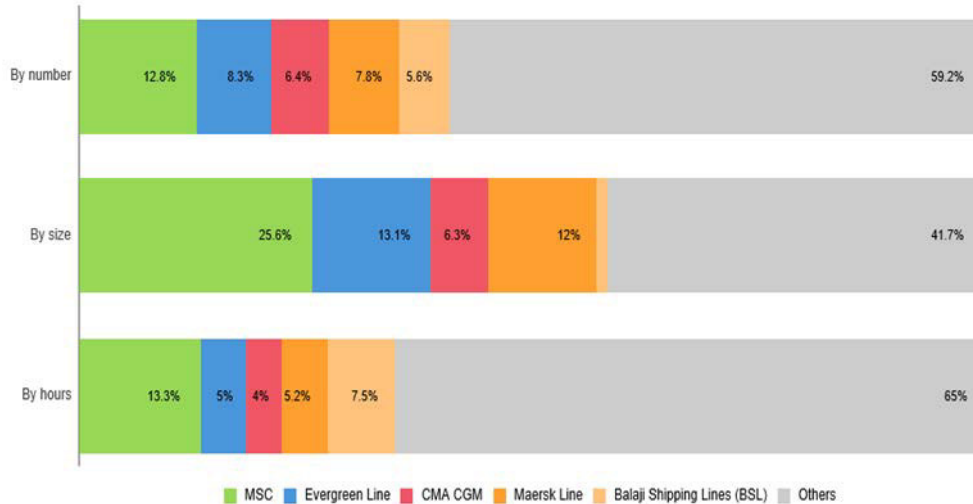
Figure 1-1 Colombo strategic position near main shipping routes – density chart



Colombo is used both for transshipment of containers from mother vessel to mother vessel (relay activities), and for transshipment from mother vessel to smaller feeder vessels. The latter is the traditional transshipment case. In this case, a hub-and-spoke system is applied, with feeder vessels distributing containers to destinations with insufficient draft, such as destinations on the East and West coasts of India, the Maldives, Bangladesh, Myanmar, and Pakistan. The relay business has increased considerably in the recent past. Main regions, such as the Middle East, East Africa, and the Indian West coast are served when the main westbound services, originating from South East Asia or the Far East, relay their cargo to the eastbound services originating from the US East Coast, Europe, and Middle East. It should however be noted that transshipment trade is “foot-loose”. This means that the activity of transshipment can be moved to other ports should the shipping line wishes to concentrate its transshipment somewhere else along the shipping chains. At the same time the tariffs for transshipment handling are low compared to gateway cargo handling simple because of this competitive

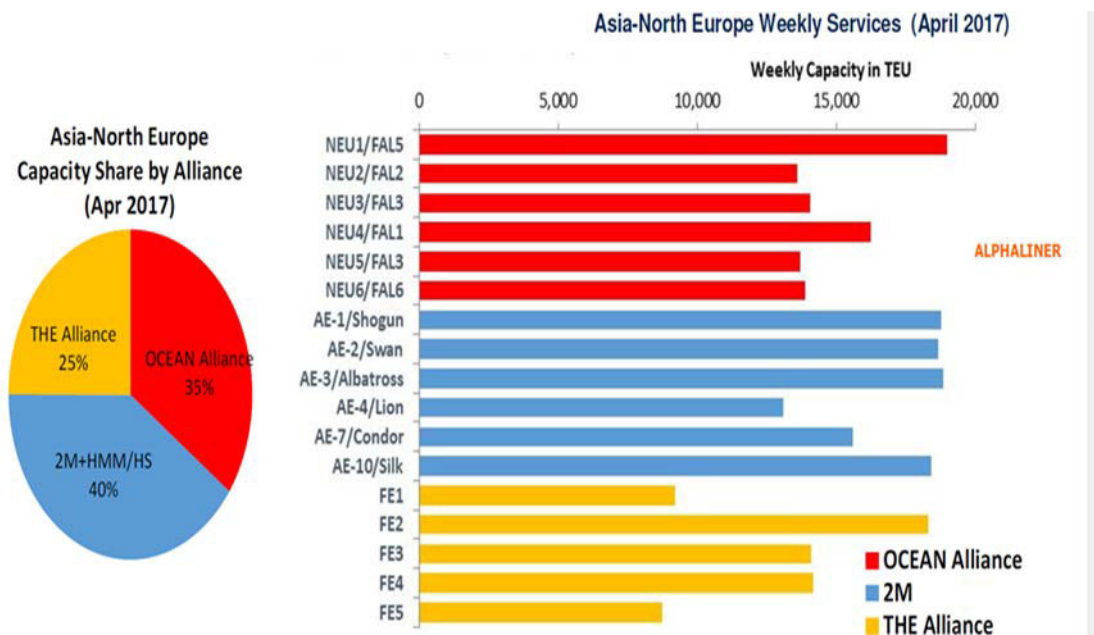
edge. This also stresses that the efficiency of handling and other service elements play a role in the competitive profile of a transshipment port.

Out of the 17 East-West Services Colombo only receives 3 of the main services performed by the Ultra Large Container Vessels.



Source: Alphaliner

MSC is the largest operator in Port of Colombo by number of calls and by average sizes. The three main East West services are the NEU6, AE-1 and the FE5 displayed in the picture below.

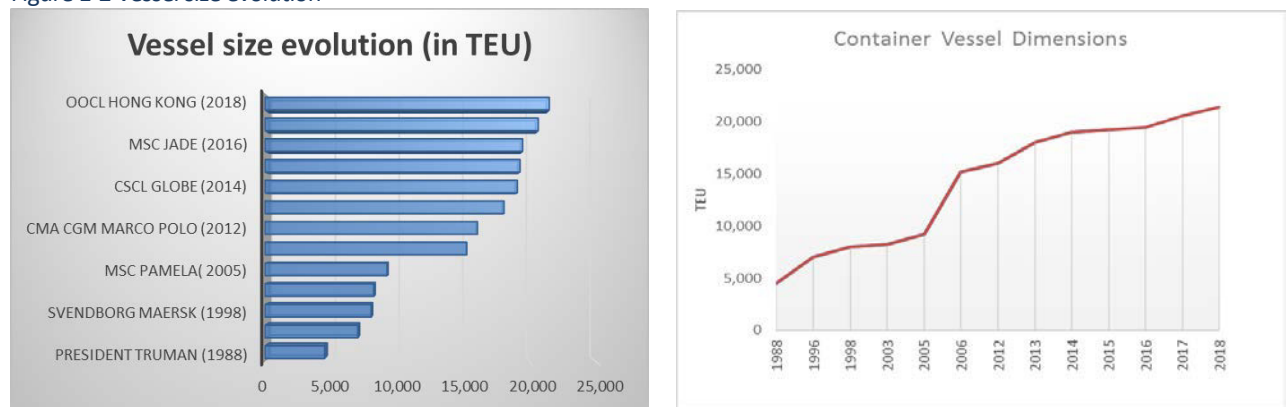


Vessel sizes continue to increase rapidly

The trend towards larger vessels sizes is caused by the cost focus of shipping lines. They maximise economies of scale and reduce unit costs through applying larger vessels. The fact that growth of the global economy has been limited contributed to lower demands and lower freight rates. This again urged shipping lines to excel in ordering larger units to save fuel through technological improvements and to further reduce unit costs. Larger vessels also have implications for the port design as larger depths are required and bigger and more cranes are needed to maintain a competitive level of efficiency. Also, the stacking area and the hinterland connections faces new challenges as huge quantities have to be moved in short time frames.

The typical large container vessel increased from 3,000 TEU in 1980 to the “EMMA MAERSK” of 15,000 TEU in 2006, the MAERSK McKinney MØLLER of 18,000 TEU vessels (Triple E-class) in 2013, and in 2017 the vessel MAERSK MADRID of 20,568 TEU. The latter is part of the new Triple E – II-class which have a dimension of 400m*58m*16.5m (LOA, Width, Draught) and are especially designed for the Far East - North Europe trade. The largest vessel today is OOCL Hong Kong with 21,400 TEU and a dimension of 400m*58.8m*16m.

Figure 1-2 Vessel size evolution



The cascading trend (the newest, largest vessels replace the current vessels on the main trade lanes, the vessels being replaced will in turn replace smaller vessels on other trade lanes), also impacts the Sri Lankan ports. The Indian West coast has seen massive improvements in vessel sizes as more direct trades became feasible due to available ships. The vessel size increased from 3,000 TEU to 4,000 TEU towards 7,000 TEU. In Colombo vessel sizes also increased rapidly. The port accommodates the world largest vessels in South Port upto 22,000 TEU and has noted increased feeder vessel sizes as well.

Alliances and consolidation are changing the power scene on the shipping lines

The East-West container routes, including the North Europe and the Mediterranean - Far East trades, are dominated by the so-called East-West Alliances. Several years ago, there were more than six alliances including the New World Alliance and the Grand Alliance. Presently there three major alliances left, their carriers are (short names, in alphabetical order), all visualised here below:

Thus, effective July 2017, the now 10-carrier Alliances scene (instead of 16 in 2014) will look as follows:

- 2M+ Hyundai, Maersk Line, MSC
- Ocean Alliance CMA CGM/APL, COSCON, Evergreen, OOCL
- THE Alliance Hapag-Lloyd/UASC, Hanjin*, Yang Ming and ONE (“K” Line, MOL, NYK)

* Hanjin Shipping went into financial default at 31st of August 2016.

ONE (“K” Line, MOL, NYK) starts operations by April 2018.

Next to the 10 Alliance members on the East West trades there still exist four shipping lines outside the alliances namely; Hamburg Süd (acquired by Maersk), PIL, Wan Hai and ZIM.

The consequence of the mergers is that more combined services are offered, generally speaking leading to less services with larger vessels. Also, the port bargaining power changes due to the alliances becoming larger and fewer. Finally, there is a stronger relationship between the shipping lines and the global port operators than in the past. Many shipping lines have (through their parent) a tie with a network of terminals. For example, the AP Møller group owns APM Terminals and Maersk Line, CMA CGM owns Terminal Link, and

COSCO owns Cosco Pacific as terminal group. Next to these shipping line terminal operators there are independent terminal operators such as for example PSA, DP World, Eurogate and ICTSI.

For Sri Lankan ports the consolidation of shipping lines is important as each alliance like to concentrate its shipping network at selective terminals, in order to optimise their network costs. Whenever feasible, the alliance members will focus on terminals calls at members of their own network of port operators.

Changing management models in Ports

Globally the trend towards more specialisation of cargo handling, combined with larger vessels, and capital constraints at Port Authorities, have changed the land scape for port authorities to allow more private involvement in cargo operations. The trend supports the general perspective that private companies are better equipped and more efficiently organised. Meanwhile large labour forces in traditional ports have been restructured to address the change towards privatisation. Generally, speaking this trend has continued since the 1990s and resulted into a move from central led and operated port authorities in a “service port concept” to a “landlord model” in which a split was made between regulation, facilitation of trades and the operational function of cargo handling.

This is illustrated in next graphics.

Port management model	Private Sector	Regulation	Infra	Super-structure	Equipment	Labour	Nautical services
0. Public service port (as is)	Zero	Public	Public	Public	Public	Public	Public
1. Landlord + private terminal	Medium	Public	Public	Private	Private	Private	Public or private



The main advantage of landlord models compared to service ports is that the State often has no influence on the day to day operations or regulations. The landlord port authority acts as landowner (mandated by the state) and as regulator through a port act (mandated by the state). Another advantage of landlord models is that private investors can develop and operate specialised terminals under concession contracts. In this way the industry specialists become active in the port and the Port Authority has the ability to own and create the land, set the port regulations and national tariff on marine services and perform the auxiliary functions when they are not outsourced to private sector as well.

Moreover, Government controlled Port Authorities have moved into corporatisation and even privatisation as well. In the latter, often the Government shareholding is still majority, but the Port Authority has become a company under the state companies acts.

Technical changes in the maritime shipping industry

Through conventions of the International Maritime Organisation and SOLAS several important changes are faced by the shipping industry such as:

1. Ballast water management
2. Emission reduction
3. Verified Weight Measurements

Ballast water management

IMO's Ballast Water Management will come into force in September 2017. This convention enjoys the accession of 52 parties and involvement of 35 percent of the global merchant shipping tonnage. It requires all ships of 400 gross tonnage and above (including all existing vessels except floating platform, FSUs and FPSOs) to possess International Ballast Water Management Certificate (IBWMC). The time consumed in terms of ballasting and deballasting are considered as unproductive times for ships.

Emission reduction

IMO's regulation Annex VI for reduction of air pollution (including SO_x, NO_x, Particulate Matter, and Green House Gases) is another influential trend that has the potential to develop restrictions and incur huge costs in the industry.

Verified Weight Measurements

The International Maritime Organization (IMO) has amended the SOLAS (Safety of Life at Sea) convention under regulation 2 of chapter VI which mandates the declaration of the Verified Gross Mass (VGM) of a packed container before loading on board vessels within a prescribed cut-off date / time to the shipping line and / or port terminal authorities. Effective 1st July 2016, the regulation stipulates the use of two approved methods to declare the VGM for each container by the shipper or his representative. The first is through weighing the box including content or alternatively the content is weighted and the tarra of the container is added. This regulation has increased the demand for weighing points in the port and terminals.

Digitalisation in the port industry

Digitalisation in the port industry is the upcoming trend. Many ports in the world have implemented either Electronic Data Exchange (**EDI**) for transfer of point to point communication. The FAL convention makes it mandatory by 2018 to implement digital communication between ships and port authorities under the **FAL convention**. Several ports have implemented a **Port Community system** which allows EDI communication in a single window between multiple parties simultaneously and sharing data amongst parties. Samples are Port of Singapore, South Korea, The Netherlands and so on.

The next focus is to increase digitalisation across the supply chain. Port Authorities like Port of Rotterdam develop the SMART port concept in with port users are connected through SMART applications on mobiles phones, tablets etc through the use of **Internet of things**. Related this are the latest developments around **Blockchains**. The latter reflects keeping data on the cargo in a secured chain to which allows full control on status, quality information and payments along the chain.

Additional information on Port Community Systems is displayed in a separate chapter.

International Port Competition

Sri Lanka is an important regional maritime hub, due to its strategic position near the East-West trade routes. Currently, Sri Lanka – through the port of Colombo – mainly serves as a hub for cargo destined for other nations in the Indian Sub-Continent. However, several recent and planned developments put pressure on Sri Lanka as a maritime hub. The table below provides an overview of Sri Lanka’s key strengths, weaknesses, opportunities, and threats concerning its competitiveness as a maritime hub.

Strengths

- Geographically strategic situation near the main East – West trade routes
- Strategically situated to serve countries in the Indian Sub-Continent
- Substantial water depths near the coastline
- Transshipment tariffs at Colombo are competitive compared to other regional hub ports

Weaknesses

- Broad maritime sector and related services are less developed than competitors, such as Singapore

Opportunities

- Rapid growth of demand in Indian Sub-Continent countries
- FDI on maritime silk route
- Consolidation point for draft limited ports in Bay of Bengal
- Attract new industries through FDI

Threats

- Development of deep-water ports in India and Bangladesh
- Development of transshipment hubs in South East Asia and the Middle East
- Improvement of Maritime Policies in India

The three identified threats are further discussed below.

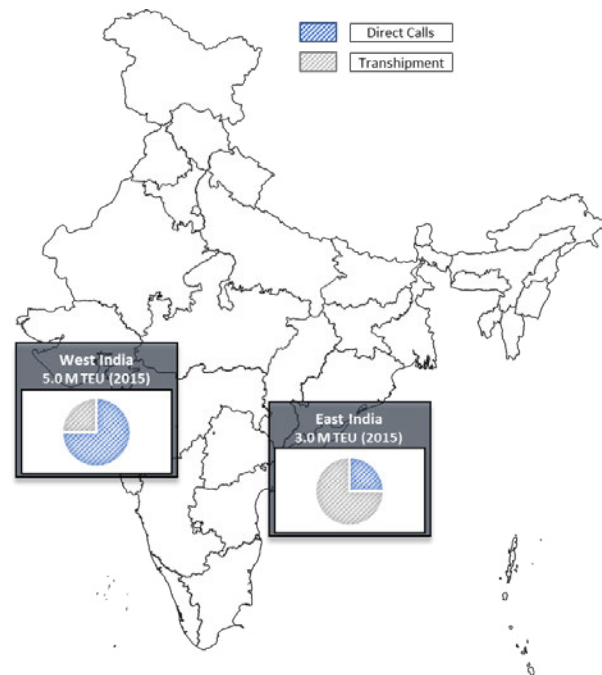
Development of Ports in India and Bangladesh.

India and Bangladesh are Sri Lanka’s main transshipment destinations, as their ports traditionally have not been able to accommodate mainline vessels due to lagging port infrastructure. However, ports in India and Bangladesh are slowly being developed, posing a threat to Sri Lanka’s position as regional hub.

In 2015, total containerized throughput in Indian ports amounted to approximately 8.0 M TEU, of which 5.0 M TEU was handled at Western Indian ports.

With the development of Jawaharlal Nehru Port (JNP; also known as Nhava Sheva), which handled approximately 4.5 M TEU in 2014-2015, and the second largest port, Mundra (1.75 M TEU), the dependence of Western Indian states on transshipment has substantially declined.

Consequently, the share of transhipped containers handled at Western Indian ports dwindled to 25% in 2015.



Currently, East India and Bangladesh are still dependent on transshipment, as adequate deep-water port infrastructure is lacking. However, with several port projects planned in India and Bangladesh, transshipment potential for the Indian Sub-Continent may further deteriorate. Inter alia, the following Greenfield deep-water port projects have been identified:

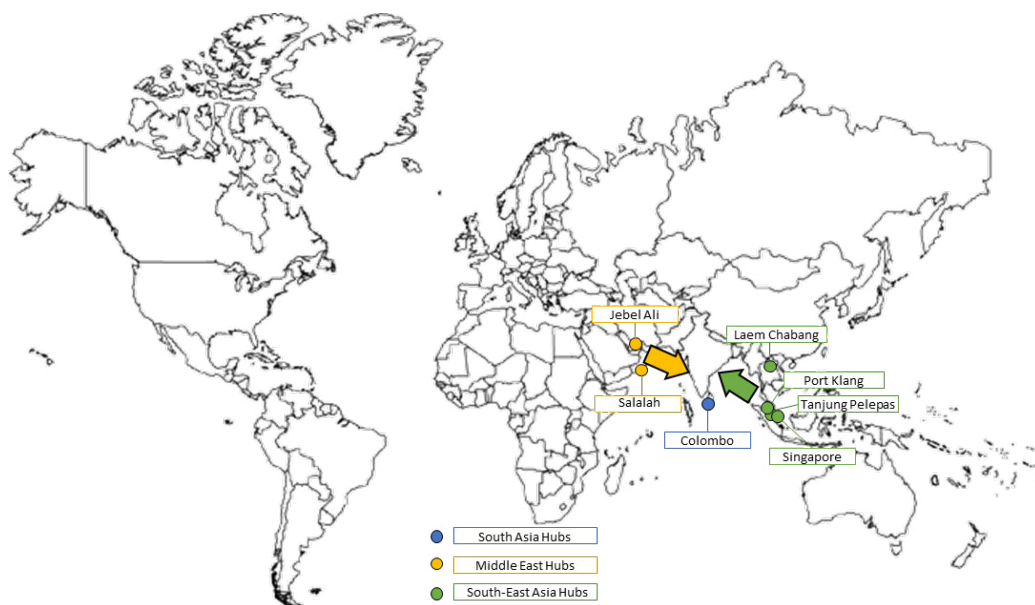
- India
 - Colachel / Enayam port

- Vizhinjam port
- Bangladesh
 - Sonadia port
 - Payra port

Development of Regional Transshipment Hubs

Sri Lanka’s competitive field for serving the Indian Sub-Continent has developed substantially over the last decade. The figure below provides an overview of Sri Lanka’s competitive field; the following can be observed:

- Broadly speaking, there are 3 hub port groups in the region; the Middle East hub group, consisting of Jebel Ali and Salalah; the South Asia hub group, consisting of Colombo; and the South-East Asia hub group, consisting of Singapore, Tanjung Pelepas, Port Klang, and Laem Chabang.
- Due to the strong development of the Middle Eastern hub ports, Sri Lanka’s market share for transshipment to Western Indian ports has declined.
- For East India’s market share, Sri Lanka mainly competes with Southeast Asian ports, such as Singapore, Tanjung Pelepas, and Laem Chabang. Currently, Sri Lanka is the most dominant player for serving the East Indian market. However, several large-scale development plans, such as Singapore’s new Tuas Terminal project, may put further pressure on Sri Lanka’s Transshipment ambitions.



The table below presents the throughputs of the hub ports depicted above, as well as the ports’ compound annual growth rates for the period from 2011 to 2015.

Table 1-1 Competitive Container Hub Ports

Port	Unit	2011	2012	2013	2014	2015	CAGR (%)
Middle East hub ports							
Jebel Ali	M TEU	13.0	13.3	13.6	15.3	15.6	4.66%
Salalah	M TEU	3.1	3.6	3.3	3.0	2.6	(4.30%)
Khalifa	M TEU	-	0.8	0.9	1.1	1.5	n/a
South Asia Hubs							

Colombo	M TEU	4.3	4.2	4.3	4.9	5.2	4.87%
South East Asia Hubs							
Singapore	M TEU	29.9	31.6	32.2	33.9	31.0	0.91%
Port Klang	M TEU	9.6	10.0	10.4	11.0	11.9	5.52%
Tanjung Pelepas	M TEU	7.5	7.5	7.4	8.2	9.1	4.95%
Laem Chabang	M TEU	5.7	5.9	6.0	6.6	6.8	4.51%

Subsequently, the table below presents several identified expansion plans for Colombo's current competing hub ports, as well as plans for Greenfield ports aimed at handling transshipment cargoes to Colombo's main feeder markets.

Table 1-2 Competitive Container Hub Port Development Plans

Port	Unit	Current Capacity	Future Capacity	Capacity Increase
Middle East Hub Ports				
Jebel Ali	M TEU	19.0	22.1	3.1
Salalah	M TEU	5.0	7.5	2.5
Khalifa	M TEU	2.5	15.0	12.5
South Asia Hub Ports				
Vizhinjam	M TEU	-	3.4	3.4
Colachel	M TEU	-	8.0	8.0
South East Asia Hubs				
Singapore	M TEU	35.0	65.0	30.0
Port Klang	M TEU	16.6	18.6	2.0
Tanjung Pelepas	M TEU	10.5	17.0	6.5

Sri Lanka Ports and their functions

Port Sector Overview

Sri Lanka's port sector comprises several ports around the island, including Colombo Port, Galle Port, Trincomalee Port, Hambantota Port, Oluvil Harbour, Puttalam Jetty, Point Pedro Port and Kankesanthurai Harbour.

The country's three largest ports (shown in the figure on the right) are:

- Colombo Port, situated on the West coast of Sri Lanka;
- Hambantota Port, situated on the South coast of Sri Lanka; and
- Trincomalee Port, situated on the East coast of Sri Lanka.

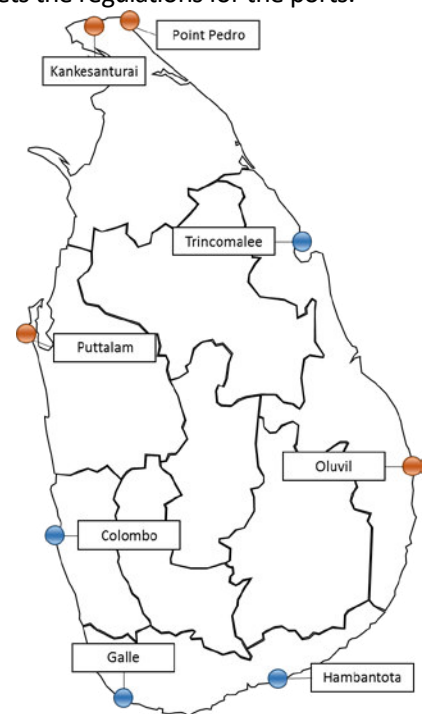
The country's other ports¹ include:

- Galle Port, situated on the South-West coast of Sri Lanka;
- Puttalam Coal jetty, a small port on the West coast;
- Kankesanthurai (KKS) and Point Pedro on the Northern coast; and
- Oluvil on the East coast.

The Sri Lanka Ports Authority (SLPA) acts as the national port authority and has a hybrid role in the country's port sector. The SLPA simultaneously fulfils the following 6 roles:

1. Landlord – The SLPA has conceded several terminals in Colombo port under a landlord PPP structure.
2. Service Port – The SLPA provides port services, such as warehousing, support services, and administration.
3. Cargo handler – SLPA is cargo handler or stevedore and owns and operates container terminals and multi-purpose or common terminals in the ports of Sri Lanka.
4. Regulator – As regulator, the SLPA provides licensing services and sets the regulations for the ports.
5. Harbourmaster and marine service provider in all Sri Lankan ports
6. Port planner and port developer – SLPA plans, constructs and develops ports in Sri Lanka

The table below shows the current usage in Sri Lankan ports with respect to cargo- and passenger handlings.



¹ Fishery ports in Sri Lanka comes under the Ministry of Fisheries & Aquatic Resources and do not fall under SLPA, hence they are not mentioned here.

Table 1-3: Functional Overview Ports Current usage

Port	Container Transshipment	Containers	RoRo	Break Bulk / General Cargo	Dry Bulk	Liquid Bulk	Passengers
Colombo	X	X	X	X	X	X	X
Trincomalee				X	X	X	X
Hambantota			X	X		X	X
Galle				X	X	X	X
KKS				X			
Oluvil				X			
Puttalam					X		

In terms of port throughputs on gateway cargoes, Colombo Port is the most important port with 77% of all cargoes handled.

Including transshipment, the Port of Colombo has a total market share of 88% within Sri Lanka.

Table 1-4: Port Gateway Throughput (million Tons)

Port	Gateway Container	Coal	Wheat / Maize	Cement / Clinker /	Fertilisers	Crude Oils	Refined Oils	Other Liquid Vehicles*	General Cargo	Total Per Port	Share of Total	
Colombo	14.20	-	.19	2.19	.31	1.69	2.87	.19	.05	.71	22.39	77.7%
Trincomalee	-	.10	.87	2.24	-	-	.28	-	-	-	3.49	12.1%
Hambantota	-	-	-	-	-	-	.03	-	.33	-	.35	1.2%
Galle	-	-	-	.77	-	-	-	-	-	-	.77	2.7%
KKS	-	-	-	-	-	-	-	-	.03	-	.03	0.1%
Oluvil	-	-	-	-	-	-	-	-	-	-	-	-
Puttalam	-	1.79	-	-	-	-	-	-	-	-	1.79	6.2%
Total Per Commodity	14.20	1.89	1.06	5.20	.31	1.69	3.17	.19	.05	1.06	28.83	100.0%
<i>Share of Total</i>	49.3%	6.6%	3.7%	18.0%	1.1%	6.0%	11.0%	0.7%	0.2%	4.7%	100.0%	

*Transshipment of containers and vehicles are not considered in the total port throughput.

Source: SLPA

The number of vessels at the port of Colombo is 88% of all vessel arrivals in Sri Lanka. These vessels are dominantly commercial traded vessels handled by the cargo terminals. The ship repair segment only handled 50 vessels in 2016 or 1%. The total number of ships that took bunkers is around 35. The table illustrates that ship repair and bunkering are today relatively small markets.

Table 1-5: Ship Arrivals 2016

Port	Cargo Ships	Ships for Repair	Ships-bunkering	Other Ships	Total Arrivals
Colombo	4,280	46	29	50	4,405

Port	Cargo Ships	Ships for Repair	Ships-bunkering	Other Ships	Total Arrivals
Trincomalee	207	1	4	4	216
Hambantota	273	1	-	7	281
Galle	83	2	2	9	96
KKS	25	-	-	-	25
Oluvil*					
Puttalam*					
Total Arrivals	4,868	50	35	70	5,023

Source: SLPA

*No data available

Port of Colombo

General

Colombo is located on the West coast of Sri Lanka and is country's principal city and port. The port handles containerized cargoes, liquid bulk (crude oil and refined products), dry bulk (mostly grain and cement), general cargoes (mainly steel products, timber and RoRo) and cruise passengers. It is located near the main East West shipping routes and has become a major port for gateway cargo and transshipment of containers. The port covers three large containers terminals and has another one under development. Transshipment of containers accounts for approximately 75% of Colombo's total container traffic; the remaining 25% comprises local containerized cargo, driven mainly by exports of garment, tea, and rubber, and imports of consumer products, industrial and agricultural equipment. Whilst there is almost no effective competition for domestic cargo, Colombo competes with several major hub ports for transshipment traffic. In this segment, the port has benefitted from its strategic location, both close to the main east-west trade and close to the large and strongly growing Indian market.

The port handled 81.8 million tons in 2016 including 5.7 million TEU of containers. In 2016 the port had about 4,405 ships arrivals and was ranked as 23rd largest container port in the world. The port handles the largest container vessels in the world having dimensions of 400m in length and a capacity of 21,500 TEU due to quays with ample water depths of CD -18m and state of the art terminals.

The port was developed along the natural bay at the city and the old basin covers about 201.5 ha. A major expansion program has resulted in the development of South Harbour which came into operation by 2013. The new port basin consists of one state of the art terminal container terminal (58ha) and another container terminal that soon will be launched. The basin has space for a third container terminal and a liquid terminal.

Additionally, to handling imports, exports and transshipment, the Port of Colombo offers non-cargo services including harbour master services, pilotage and tugging, bunkering, ship repair, warehousing, water supply, weighing and scanning services, firefighting, hospital services, financial services and ship chandlery. Also, the navy is situated within the port limits. To the north of the port a maritime training institute is situated.

The port of Colombo is important for the nation and facilitates the majority of the import and exports trades today. The city is under large developments with the erection of many new hotels and resident flats and rehabilitation of historic buildings. Further, a new city port development, south of the existing port, including hotels, conference centres, residential flats, shops and marinas is under development. The new port city will be connected through an elevated highway which also creates additional port access. The western region has several plans for city and urban developments and improvements. Combined, the western region

developments and the city of Colombo generate high demands for the port of Colombo. This translates to required port improvements, a new cruise terminal, enlarged connectivity and major future port planning both for containers as well as for liquid bulk and multipurpose. Additional demand for warehousing and logistics needs to be captured in future planning as well.

Figure 1-3: Map Port of Colombo



	UCT	JCT	CICT	SAGT	PVQ	South Jetty	New North Pier	Colombo Dockyard	Slipway	JCT Feeder Berth	New Feeder Berth	Coastal Berths	Bandaranaika Quay	Sydney/Melbourne	Passenger Berth	Water Supply	Canal Berth	ECT	Dolphin Tanker Berth	Cement Storage	Warehouses	Weighing & Hospital	Fire Brigade	Training Centre	Tug & Pilot Station
Number on Map	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	Not Indicated on Map				
Containers	■		■	■						■	■								■						
Ro-Ro	■																								
Dry Bulk					■																■				
Liquid Bulk						■														■					
Gen. Cargo				■			■						■												
Passengers															■										
Ship Repair								■	■																
Navy												■													
Auxiliary														■		■						■	■	■	■

Hinterland Connectivity

The port is characterised by an internal road network of four lanes (two lanes in both directions), leading to the main exit gate to the north. The port has a total of eight gates of which three are used for cargo. The maximum allowable height is limited (4.2m) by a bridge near the main administration building or 4.5m near main exit gate. Over-height cargoes are moved outside the port through customized route-solutions. A new elevated highway is planned on top of the existing port access road. The port will be connected to the highway with dedicated ramps.

The only rail connection with the port is a single track to Bandaranaike East Quay (13 on map). The rail connection is only used for the import of rail wagons into the country but currently this rail is not operational. The port has no rail connection to the Colombo South Port.

Cargo Traffic

The port of Colombo is the largest port in Sri Lanka with about 8 million tons handled per annum excluding containers. Between 2005 and 2015 the CAGR on “non-containerised cargo” was 1.1% per annum. Over the last ten years the dry bulk grew by 1.6%, and the liquid bulk by 1.3%. The non-containerised general cargo declined by 0.2%. The 2015 share of break bulk was 14%, the dry bulk represented 29% and the liquid bulk 57%. Imports of Ro-Ro and transshipment of Ro-Ro cargo in Colombo has been phased out towards Hambantota as the latter port has ample space available for this type of commodity.

Table 1-6: Throughput Bulk Colombo 2007-2016

Tons '000	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Non-containerised General Cargo	1,048	838	649	627	722	618	364	601	1,113	879
Dry Bulk	2,257	2,565	2,097	2,556	2,620	2,709	2,657	2,444	2,344	2,572
Liquid Bulk	4,264	4,068	4,026	4,159	4,565	4,839	4,265	4,420	4,579	4,746
Total	7,568	7,471	6,772	7,341	7,906	8,165	7,286	7,465	8,036	8,197

Table 1-7: Throughput RoRo Colombo 2007-2016

Vehicles in units	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Domestic	30,047	21,875	6,732	45,779	90,824	38,886	6,651	21,296	71,738	31,888
Transshipment	10,065	2,154	4,973	2,455	993	183	466	-	13	778
Total	40,112	24,029	11,705	48,234	91,817	39,069	7,117	21,296	71,751	32,666

Containers are dominantly handled at Colombo port with so far only sporadic exemptions at other ports. Containers are the main cargo at the Port of Colombo in terms of volumes handled. In 2016 about 5.7 million TEU was handled. A large part of this volume is transshipment (about 75%) which means that these boxes are transferred between ships to reach their destination. The gateway containers amounted to 25% or 1.3 million TEU which consists of imports and exports. About 82% of all containers handled are laden containers. The remainder 18% are empty containers handled. In the past decade, the gateway throughput grew with 4.9% and transshipment throughput with 5.8% (CAGR 2007 – 2016).

Table 1-8: Throughput Containers Colombo 2007-2016²

TEU '000	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Gateway	803	813	752	932	1,047	1,020	1,032	1,127	1,218	1,300
Transshipment	2,469	2,785	2,633	3,096	3,124	3,065	3,208	3,700	3,888	4,355
Total	3,272	3,599	3,385	4,028	4,171	4,085	4,240	4,827	5,106	5,655
Tonnage Handled (million tons)	35.9	40.5	39.6	51.4	54.1	53.5	56.2	63.3	65.7	73.7

Marine Traffic

Table 1-9: Marine Traffic Port of Colombo

Ship type, no of ships	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Container	3,628	3,666	3,304	3,076	3,187	3,092	3,142	3,239	3,643	3,804
Conventional	173	205	140	56	68	52	38	28	45	40
Other cargo	421	458	474	616	680	591	354	366	388	436
Ships for repairs	44	49	48	47	30	35	36	38	43	46
Ships-bunkering	12	21	106	68	65	51	50	25	30	29
Other ships	48	25	42	47	94	49	47	46	48	50
Total Ships Arrived	4,326	4,424	4,114	3,910	4,124	3,870	3,667	3,742	4,197	4,405

Port of Trincomalee

General

The port of Trincomalee comprises several scattered facilities in China Bay, a natural deep-water bay (up to 20m) on the North-Eastern side of the country. The port was originally used as a naval base. Additionally, the port comprised the country's main tea export facility (tea was handled at the Tea Traders Association (TTA) facility, as indicated on the map), after the institutional setting of Colombo port changed with the establishment of the Port Cargo Corporation (prior to the introduction of this port authority, the port was operated as a tool port). In the Northwest corner of China Bay a common fish port is located. Finally, the Mud Cove facility acted as a regional maintenance and repair facility, providing a slipway and workshops. The introduction of night navigation shall enlarge the accessibility and capacity of the port.

The naval base is operational and the SLPA managed TTA facility and Ashroff Jetty are currently used for imports of coal, clinker, and gypsum and general cargo, most of which are destined for a cement plant. Sometimes the Ashroff quay is also used as a Cruise berth.

Besides SLPA managed facilities, the China Bay comprises several private waterfront facilities. The three main private waterfront facilities comprise:

- Tokyo Cement Milling Facility – a cement mill with a jetty that is used to import clinker to produce cement.

² Data is excluding re-stowage

- Prima Flour Milling Complex – a flour milling complex with a production capacity of 3,600 metric tonnes per day, and a storage capacity of 200,000 tonnes.
- Lanka IOC Facility – Lanka IOC is the Sri Lankan subsidiary of Indian Oil Corporation (IOC), the Indian petroleum company. This facility includes several storage tanks west of the Flour mill and many unused oil tanks Northeast of the airport.

Table 1-10: Functions Port Facilities Trincomalee

Facility Name	Containers	Ro-Ro	Break Bulk	Dry Bulk	Liquid Bulk	General cargo	Passengers	Ship repair	Navy	Auxiliary
Tokyo Cement				X						
Mud Cove								X		X
Ashroff Quay				X		X	X			
TTA			X							
Lanka IOC					X					
Prima Flour				X						
Navy facilities									X	

Figure 1-4: Trincomalee Facilities



Item	Value	Unit
Harbour Basin	2,000	ha
Ashroff Jetty – Main Berth Length	250	m
Ashroff Jetty – Side Berth 1 Length	90	m
Ashroff Jetty – Side Berth 2 Length	90	m
TTA Quay – Berth Length	190	m
Ceylon Quay – Berth Length	50	m

Mud Cove Jetty – Main Berth Length	50	m
Mud Cove Jetty – Side Berth Length	40	m
Prima Flour – Jetty Length	150	
Tokyo Cement – Jetty Length	240	m

Hinterland Connectivity

The existing railway line currently reaches the private facilities of Prima Flour and Tokyo Cement heading west. The future expansion of the railway to Ashroff Jetty is essential for smooth operations at the jetty. The port is connected by road to the east coast of Sri Lanka through the A15 and heart of the country in the direction of Colombo through the A6. Currently, the area west of the port lacks sufficient connection for it to be developed. A road connection along the rail connecting it with the A15 and the A6 is proposed in case of further development of the area.

Non-Containerised Cargo

The dry bulk import covers majority of the throughput in Trincomalee. The throughput amounted to 3.2 M tons in 2016, which is less than half of the throughput in Colombo. Dry bulk imports account for most of the throughput in Trincomalee. Below the table shows the Trincomalee Port throughput. The cargo on the Ashroff jetty is mostly destined for the Siam Cement facility in Puttalam and consists mainly of coal and clinker. There is a mid-stream operation to load clinker to vessels destined for Galle.

Table 1-11: Trincomalee Non-Container Throughput 2013-2016 per Operation

Commodity	2013	2014	2015	2016
	('000) Tons	('000) Tons	('000) Tons	('000) Tons
Total Dry and Liquid Bulk	2,440	2,750	3,020	3,549

Source: SLPA

Marine Traffic

Cargo ships remain the main category of ships calling at Trincomalee port. Although the port today is limitedly called for repair or bunkering, the number of vessels is increasing, supported by higher throughputs and more lay-up/service vessels.

Table 1-12: Marine Traffic Port of Trincomalee 2010-2016

	2010	2011	2012	2013	2014	2015	2016
Cargo ships	0	0	0	113	120	158	207
Ships for repairs	0	0	0	3	1	1	1
Ships-bunkering	0	0	0	6	1	2	4
Other ships	0	0	0	12	5	3	4
Total ships arrived	109	126	161	134	127	164	216

Source: SLPA

Port of Hambantota

General

Hambantota port is situated just east of the southern tip of the country, approximately 10 nautical miles from the main east-west maritime trade lanes passing Sri Lanka. The port opened in 2011 and has a general cargo / RoRo quay (600m) operational. Further the port has a 315m liquid berth for bunkering and LPG. A container quay (835m), a feeder quay (470m), a (break) bulk quay (835m) to be delivered to the port operator in 2017. The port handled in 2016 0.35 million tons of cargo mainly consisting of vehicles and break bulk cargoes. It handled 281 vessels in 2016 of which 267 car carriers. The port is subject to a government agreement with port operator CMPort part of China Merchants Holdings International (CMHI). The concession contract with CMPort to operate and develop the port under a 99-years port management contract was finalised in July 2017. This deal would fit within the Chinese philosophy of building a maritime silk road with strategic nodal points along the route. Especially the available port areas (6070 ha) for industrial development in connection with the port makes the location ideal for large industries.

The management structure of the port is that of a port management company. A master concession contract was made with SLPA and a separate management company, Hambantota International Port Services (HIPS) was developed with 50.7% owned by SLPA, the remainder owned by CMPort. The company is responsible for items like; port security, navigational services, pilotage, anchorage, aids to navigation, dredging, widening and emergency responses. Further, for operations and project development Hambantota International Port Group was established with 85% CMPort share and 15% by SLPA.³

The port project was initially proposed in 2006, to accommodate expected demand growth fuelled by economic growth in the Asian continent. For this capacity expansion project, the following 2 factors led to Hambantota being preferred over Colombo:

- Proximity to the main maritime trade routes – Hambantota is more conveniently situated, as vessels on the main trade routes only require a minimal deviation to call at the port.
- Available land – Due to the port-city interface in Colombo, the port of Colombo had limited expansion potential. Conversely, there was ample land available in Hambantota.

Currently, the first phase of the Hambantota port project, which was developed by China Harbour Engineering Company (CHEC), is operational. This first phase consists of the following facilities:

- Two Ro-Ro berths of in total 600m for transshipment/imports – in 2012, the entire Ro-Ro operations were relocated from Colombo port to Hambantota port, due to the available space in Hambantota. The Ro-Ro operation covers approximately 11 ha and mainly comprises transshipment of vehicles and vehicle parts to East Africa and the Gulf region. The RoRo berth is equipped with two post panamax STS cranes.
- A small craft berth with a length of 205m.
- Bunkering berth of 315m and a LPG mooring location. –. The facility is connected to a tank farm which includes 8 tanks for marine fuel, 3 tanks containing aviation fuel and 3 for Liquid Petroleum Gas (LPG). The total storage capacity is approximately 70,000 tons, located approximately 1.2 km east of the oil terminal. Bunkering operations commenced in 2014; however, bunkering operations were halted shortly after, in February of 2015. It is envisioned that bunkering operations will recommence once a suitable operator has been selected.

Phase II consists of:

- A 15-floor administrative complex which has been constructed.
- A (break-) bulk cargo terminal is under construction with 835 m of quay and water depth of 17 m.

³ Daily Mirror, December 2017

- A container terminal with two main line berths (835m quay in total) and two feeder berths (470 m of quay) with water depths of 17m are under construction.
- 15,000 acres for a special economic zone for industry and logistics
- An island constructed at the western breakwater provides space for real estate development and marina developments

Phase II was due for finalisation by mid-2017.

The mouth of the natural harbour at Hambantota has a 22m depth. When completed, the port has a 1.5 km long breakwater, with a minimum basin depth of 17m. This is compared to the 15.5m depth of the Port of Colombo in the old port and CD -18 m in South Harbour. The turning basin inside the port is 600m. A dam will also be built to prevent flooding in nearby areas, and a seawall made of interlocking concrete blocks will protect the port from high seas.

A USD 550 million tax-free port zone was set up outside the port consisting of 15,000 acre SEZ project. The land area was sourced from several communities including 5,000 acres from Hambantota and the rest from Monaragala, Ambilipitiya and Matara. The finished project is expected to provide indirect employment to over 50,000 people. Recently, the Board of Investments (BOI) indicated that additionally a new refinery, a sugar plant and grain terminal are projected.

Figure 1-5: Hambantota Facilities



Item	Berth Length	Water Depth	Cargo / Purpose
Multi-purpose quay	600m	CD -17.0m	RoRo
Oil berth	315m	CD -17.0m	100,000 DWT Oil Vessels
Small Craft Jetty	205m	CD -17.0m	Small crafts
(Break-) Bulk	835m	CD -17.0m	Under construction
Container berths	835m	CD -17.0m	Under construction
Container feeder berths	470m	CD -17.0m	Under construction

Table 1-13: Function Port Facilities Hambantota

Facility Name	Containers	Ro-Ro	Break Bulk	Dry Bulk	Liquid Bulk	General cargo	Passengers	Ship repair	Navy	Auxiliary
Multi-Purpose Terminal			X	X						
Container terminal	X									
Liquid bulk Terminal					X					
Tank Farm										X

Hinterland Connectivity

Hambantota is connected to coastal roads to Colombo and to the east of the country. The hinterland roads are congested during the day and not suited for heavy and frequent Container transport. Mattala airport has been constructed to the north of Hambantota. It is envisioned to be an international airport which makes the port ideal for an air-sea combination.

The port of Hambantota is not linked with the national Expressway but construction is planned. The distance to the expressway is approx. 96 km. The port has no railway line connection. Internal port roads are available and constructed based on two lanes.

Cargo and ships

Table 1-14: Throughput Non-Containerized Hambantota 2011-2016

Tons '000	2011	2012	2013	2014	2015	2016
Total Bulk and break bulk	15	20	119	474	293	355

Table 1-15: Throughput RoRo Hambantota 2011-2016

Vehicles	2011	2012	2013	2014	2015	2016
Total	-	10,749	64,522	198,425	185,452	181,662

Marine Traffic

Table 1-16: Marine Traffic Port of Hambantota 2010-2016

	2010	2011	2012	2013	2014	2015	2016
Cargo ships	0	0	34	136	269	278	273
Ships for repairs	0	0	0	1		2	1
Ships-bunkering	0	0	0		63	7	0
Other ships	0	0	0	2	3	8	7
Total ships arrived	0	0	34	139	335	295	281

Source: SLPA

Port of Galle

General

Galle port is Sri Lanka's oldest port, situated near the southern tip of the island. Galle has a strong position in services to main line vessels on the East-West trade route, due to its convenient location near the maritime trade lane. However, the port has limited draft and is not able to handle large vessels. In 2016 Galle had a throughput of 0.77 million tons and handled about 96 vessels in 2016 of which 83 cargo vessels the remainder arriving for repairs, bunkering or other activities. The port handles import of rice, flour, fertilisers, cement and clinkers. The cement related imports are typically transhipped by small bulk vessels, as the larger mother vessels are unable to enter the port of Galle. Additionally, Galle is the only Sri Lankan port that offers dedicated facilities for pleasure yachts, since the completion of a marina complex in 2015. The port also receives cruise vessels during the cruise season and it is a port in which often crew changes on main line vessels are organised with fast passenger vessels. Finally, the port houses navy vessels (these vessels often occupy SLPA berths as the dedicated navy berths provide insufficient space). and the port is used for cement related imports. The introduction of night navigation shall make this port more accessible for cruise and general cargo.

Figure 1-6 Port of Galle



Berth	Berth Length	Water Depth
Closenburg Jetty 1	130m	CD -9.0m
Closenburg Jetty 2	130m	CD -9.0m
New Jetty 1	160m	CD -9.0m
New Jetty 2	86m	CD -9.0m

Table 1-17: Functions Port Facilities Galle

Facility Name	Containers	Ro-Ro	Break Bulk	Dry Bulk	Liquid Bulk	General cargo	Passengers	Ship repair	Navy	Auxiliary
Closenburg Jetty				X			X			
New Jetty			X							
OPL & crew services										X

Marina										X
Fishery Berths										X

Hinterland Connectivity

Currently, Galle is accessible by a two-lane coastal road and inland roads making it accessible for minimum amounts of traffic. Port of Galle is located at 5.8 km from the Expressway E01.

Non-Containerised Cargo

Galle currently handles break bulk and dry bulk cargo (mainly clinker for the cement power plant). The port also receives cruise vessels albeit the quays and water depths at the existing port are limited. The ancient city has a large attraction to tourism and future cruise demand can be expected. Further, the port provides crew and other services to shipping lines through fast service boats. Ships pass Galle on their East-West Voyage and crew, stores and or spares can be brought to the ships without having them to stop sailing and call at a port. The port of Galle also has a yacht marina. The cement manufacturer has expansion plans at its facility at the port. When this development has reached approval from the authorities, the annual bulk volumes would increase to 1.5 million ton of which 95% would consist of clinker and 5% of gypsum. It should be noted that both commodities require additional attention with respect to dust and quay/water pollution during operations. Through suction systems dust and pollution can be controlled effectively.

The cargo details below concern cargo discharged as there is no cargo loaded in Galle.

Table 1-18: Galle Non-Container Throughput 2007-2015

Tons ('000) Discharged	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Total Bulk	620	452	162	318	463	421	200	393	540	771

Source: SLPA

Kankesanthurai (KKS)

Kankesanthurai and Point Pedro are the small ports which provide a sea entrance to the populated northern strip of Sri Lanka. Cargo operations in both ports are limited to 26 thousand tons of break bulk cargo in 2016 for the local market. In 2016 about 25 vessels were handled. The ports also have fishery berthing at shallow drafts and a navy facility. Kankesanthurai was closed during the civil war years in until, in 2011 Indian parties financed ship wreck removal and dredging to 8 m to ensure smooth operations. It is also home to an old cement factory which was shut down in 1991. Three piers are expected to be revamped, of which one for the navy.

Figure 1-7: Facilities KKS



Item	Berth Length	Water Depth
General Cargo	100 m	CD - 7.3 m
Fishery Berth	2 x 60m	-
Navy Berths	-	-

SLPA has formulated three objectives to develop KKS port:

1. To operate a commercial berth
2. To operate a passenger terminal
3. To initiate port related businesses to strengthen the region

To do this several projects have been identified to strengthen the port infrastructure:

- Constructing a new 1,400 m breakwater
- Constructing multi-purpose berth to accommodate passenger vessels and imports and exports to India.
- Connecting the port with KKS railway station 1.2 km to the east of the port.
- A possible economic zone for food related industries.

The throughput statistics for KKS show a significant demand in 2009 followed by years of differing throughputs of break bulk / general cargo.

Table 1-19: KKS Non-Container Throughput 2007-2016

Tons ('000) Discharged	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Containerized	-	-	15	-	-	-	-	-	-	-
Break bulk	-	-	166	11	28	60	49	21	32	27
Dry bulk	-	-	-	-	-	-	-	-	-	-
Liquid bulk	-	-	59	-	-	-	-	-	-	-
Total	-	-	240	11	28	60	49	21	32	27

Source: SLPA

Oluvil

Oluvil is a small port with a 4 hectares’ general cargo yard having a 330m quay with a depth of 8 m. No throughput data has been reported. The port is mainly used for fishery which SLPA sees as its prime development goal along the development of food related industries. The detailed plans for Oluvil include:

- Inorganic Fertilizer & Agro Chemical Packing/ Storage Facilities
- Organic Fertilizer Manufacturing, Packing and Storage Facilities
- Dedicated Economic Centre
- Livestock Sector
- Milk Related Value Adding

In stage two of the commercial port development, SLPA plans to construct a general cargo berth with a length of 360 m and a depth of 11m to handle 16,000 DWT vessels.

Figure 1-8: Oluvil Port



Item	Berth Length	Water Depth
General Cargo	330 m	CD - 8.0 m
Fishery Berth	200 m	CD - 3.0 m

Puttalam Coal Jetty

Puttalam Coal jetty is a small landings jetty for the 900-megawatt (MW) coal power station located near the coast called Norochcholai Power Station or the Puttalam Coal Plant in the Puttalam District of the Northwestern Province in Sri Lanka. The annual coal requirement for the plant is around 1.4 million tons. Due to the monsoon period about 2.2 million tons is imported during the period mid-September to mid-May. The power station has a coal stock yard of 19.7 ha. The jetty has a total length of 590m but barges can only berth at the outer end of about 230m on each side of the jetty at water depth of CD -4.0m. The jetty is equipped with four coal discharge cranes to discharge coal from seven available barges (LOA 65m). The mother vessels are discharged at open sea through vessel gear into barges which sails to the jetty. Ceylon Shipping Corporation Ltd (CSC) organises the coal transportation from various countries to the outer anchorage of Puttalam with the MV Ceylon Breeze and MV Princess (63,000 DWT LOA 200m, Beam 32.2m and draught at 13.3m) and other chartered vessels.

Figure 1-9: Puttalam Coal jetty



Item	Berth Length	Water Depth
Jetty	230m berth on one side (total length jetty 590m) Berthing 65m barges on both sides	CD - 4.0 m

The supply of coal is cumbersome as coal needs to be transferred from main ship (mother vessels) to small barges at open sea. Due to monsoon periods the ship-to ship operation in open sea is postponed leading to higher stock pile requirements than normal. The plant has no additional investment planned for the coal transfer.

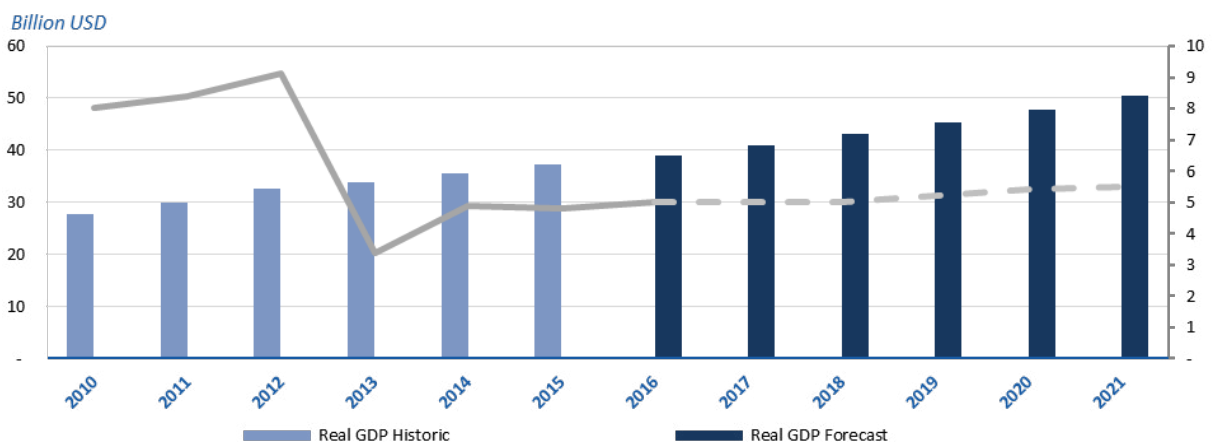
Demand analysis for the port Sector

Macro-Economic Overview

GDP Development

Sri Lanka can be considered an 21st century economic success story, with more and more people relieved from poverty every day through an impressive macro-economic development, which is leading to higher employment rates. With the end of the civil war in 2009, the country embarked on a new phase of stable development. Consequently, GDP growth reached an average rate of 6.0% p.a. over the past 5 years.

Figure 1-10: GDP Constant Prices Development 2010-2021 (Base year = 2002)



Source: IMF 2016

General Overview

With a positive macro-economic outlook, the country does face several major challenges in the years to come. The significant trade deficit causes an outflow of international monetary funds, leading to lower exchange rates. Government finances are negatively impacted by this development; as external debt is in foreign currency.

The population of Sri Lanka has been relatively stagnant over the past decade. The last census, which was carried out in 2011, revealed a population of approximately 20.5 M people, and forecasted a population of 22 M for 2021. Additionally, the population is aging: The country's working age population reached its peak in 2006, while the number of people aged 60+ is expected to double in 2041, as compared to the last census in 2011. (World Bank, 2016)

Foreign direct investments (FDI) in Sri Lanka have been low despite several fiscal measures, as can be seen in table 1.1. These investments are a good measure of a country's ability to sustain a favourable investment climate.

Table 1-20: Macro Indicators 2005-2015

Indicator	Unit	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
GDP	Current Billion USD	28.27	32.37	40.72	42.04	49.55	59.16	59.38	67.34	74.92	81.25
GDP per Capita	Current USD	1,430	1,624	2,027	2,077	2,429	2,880	2,874	3,234	3,574	3,849
Inflation consumer prices	%	10.0	15.8	22.6	3.5	6.2	6.7	7.5	6.9	3.3	3.3
Government Debt	% / GDP	87.9	85.0	81.4	86.1	81.9	78.5	79.2	78.3	75.5	76.0
FDI inflow	Million USD	479.7	603.0	752.2	404.0	477.6	955.9	941.1	932.6	893.6	681.2
FDI inflow	% / GDP	1.7	1.9	1.8	1.0	0.8	1.5	1.4	1.3	1.1	0.8
Population	Millions	19.8	19.9	20.1	20.2	20.4	20.5	20.7	20.8	21.0	21.1
Labour Force	Millions	8.4	8.3	8.3	8.3	8.3	8.3	8.4	8.5	8.6	NA
Unemployment rate	%	6.6	6.2	6	5.9	5	4.1	4	4	4	4
Urbanisation rate	%	18.4	18.4	18.3	18.3	18.3	18.3	18.3	18.3	18.3	18.3

Source: IMF 2016 and World Bank 2016

Overview Local

The western province, which includes Colombo, has the biggest share of GDP development (41.6% in 2014) and the biggest population (28.6%). The population distribution has apparently flat lined in between 2009 and 2014, but in the GDP development one can note a slight increase in the shares of other provinces other than Colombo.

Trade and production

The Sri Lanka exports are reliant on garments, tea and rubber, which are relatively low in value. The focus on exports of low value commodities results in a structural trade deficit, which is hurting the economy. Additionally, whereas rubber can be sustained as a competitive commodity, tea and garments face international competition from low-wage countries. Hence, the country should invest in manufacturing and diversification of its economy to maintain its strong economic growth. The shift to a more open economy will facilitate growth of manufacturing and industrial demand.

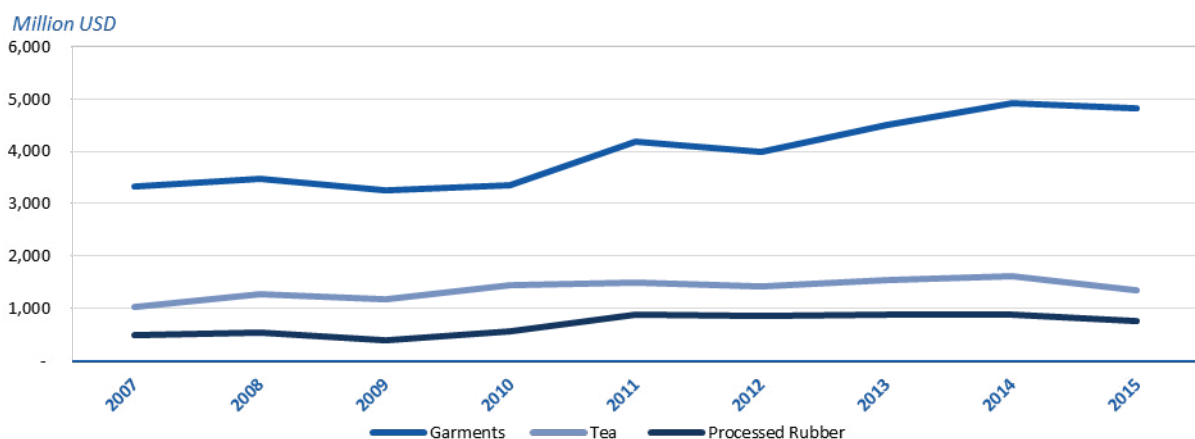
The development of value-added downstream activities in the manufacturing and industrial sectors will boost imports of raw materials and exports of end products.

Garment, tea and rubber together formed more than half of the USD 10,500 M export value in 2015. The export values seem to have flat lined, as can be noted from Figure 4-2. The tea and garment industry have low income competitors on a global scale (Haussmann, 2016). Sri Lanka is responsible for 28.0% of the global tea exports, facing also competition from countries like Kenya and India, that have a lower GDP per capita. The lower GDP per capita implies lower labour costs and consequently lower wages. This same analysis holds for the garment industry in which Sri Lanka may further develop itself focussing on quality whilst low cost competition is provided by countries like Cambodia and Bangladesh. The rubber exports show a different trend where the global main competitors like China and Thailand have a higher GDP per capita than Sri Lanka, thus the country is in a better position to compete in this industry.

Currently, Sri Lanka has an underdeveloped industry and manufacturing sector. However, it is expected that these sectors will be substantially developed. Specifically, the following broad developments can be noted:

- Overall, manufacturing and industrial activities will increase substantially.
- Medium manufacturing and industrial activities will be forced out of densely populated areas.
- Light manufacturing and industrial activities will be concentrated in and near the main metropolitan areas.
- Manufacturing and industrial areas will develop in central Sri Lanka, in line with currently proposed industrial estates.
- Manufacturing and industrial activities will develop in southern Sri Lanka, due to the establishment of a large FTZ in Hambantota.

Figure 1-11: Garment, Tea and Rubber Exports 2007-2015



Source: Sri Lanka Central Bank 2016

Tourism & Cruise

The tourism sector is an area of focus for the government as it is underdeveloped and has a lot of potential to bring foreign currency and foreign exposure to the country of Sri Lanka. The tourism sector is increasing in size and revenues. Port-related tourism is expected to grow substantially over the short to medium period, as general and port-specific Cruise facilities are further improved and created.

The government of Sri Lanka made tourism development a key focus point by instating the Sri Lanka Tourism Development Authority in 2005. The authority identifies special tourism zones where investments and coordination can take place to attract people to the country. Table 4-6 demonstrates that tourist arrivals, employment and receipts have been picking up for the past years, and this trend is expected to continue due low current foreign tourist expenditure per capita.

Sri Lanka's tourism sector has grown substantially over recent years, as tourist arrivals increased from 0.56 M in 2006 to 1.80 M in 2015. The Sri Lanka Tourism Development Authority intends to foster further rapid growth, to increase the annual number of tourists to 2.20 M by 2016, and 4.00 M by 2020.

Table 1-21: Tourism Overview 2006-2015

Item	Unit	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Tourist Arrivals	1000 People	559.6	494.0	438.5	447.9	654.5	856.0	1,005.6	1,274.6	1,527.2	1,798.4
Total Employment	1000 People	133.6	145.2	123.1	125.0	132.1	138.7	162.9	270.2	299.9	319.4
Direct Employment	1000 People	55.6	60.5	51.3	52.1	55.0	57.8	67.9	112.6	129.8	135.9
Indirect Employment	1000 People	77.9	84.7	71.8	72.9	77.0	80.9	95.0	157.6	170.1	183.5
Gross Tourist Receipts	USD M	410	385	342	350	575	830	1,039	1,715	2,431	2,981

Source: Sri Lanka Central Bank, 2016

Sri Lanka has several touristic features all available in one island with limited distances from major cruise ports and airports. The cruise touristic values of the nation are:

- Sri Lankan social and cultural heritage
- Flora and Fauna
- Beaches
- Friendly people

Cruise industry shall also increase especially due to:

- Global interests in cruises due to widening of target groups.
- Cruise in Asia is new and fast-growing market.

- Vessels must travel between seasonal cruise markets (Caribbean/Europe/Asia) and Colombo is strategically located in the middle with ample tourism features.

The cruise industry gains a lot of attention by the Ministry which aims to create sustainable tourism development in Sri Lanka by:

- Focus on Colombo, Galle/Hambantota and Trincomalee
- Economics (gain revenues)
- Socially (integrate society, peace/ harmony)
- Environmental friendly (do not damage the environment)
- Above translates to the following needs assessments in ports:
- More common cruise berths near the city (walking distance)
- Marketing strategy needed
- Terminal building for the main cruise port of Colombo
- Develop home port concept (attract cruise passengers who start the cruise by flying-in)
- The cruise terminal focus on safe transit and shopping

Forecast on Commodities

Forecasts summary

The forecast methodology and key assumptions are discussed in detailed in the document, here the forecast results are presented under the Base Case scenario.

Table 1-22: Summary Forecasts and Growth

Commodity	Demand 2016	Demand 2025	Demand 2030	Demand 2050	Difference 2016 -2050	CAGR
Containers ('000 TEU)						
Gateway	1,300	2,197	2,630	3,737	2,437	3.15%
Transshipment	4,355	5,873	6,433	12,671	8,316	3.19%
<i>Total</i>	5,655	8,070	9,063	16,408	10,753	3.18%
Dry Bulk ('000 Tons)						
Coal	1,932	2,400	2,400	2,400	468	0.64%
Wheat / Maize / Corn	1,057	1,714	2,012	2,279	1,222	2.29%
Cement / Clinker / Gypsum	3,890	5,742	6,399	7,782	3,891	2.06%
Fertilizer	314	1,536	1,536	1,536	1,222	4.78%
Biomass	-	325	500	500	500	-
Ilmenite	-	700	700	700	700	
<i>Total</i>	5,364	12,317	13,447	15,097	9,733	3.09%
Liquid Bulk ('000 Tons)						
Crude Oil	1,685	2,512	7,512	7,512	5,826	4.49%
Refined Oil	3,059	5,322	1,691	4,527	1,468	1.16%
LNG	-	1,561	1,991	3,988	3,988	

Commodity	Demand 2016	Demand 2025	Demand 2030	Demand 2050	Difference 2016 -2050	CAGR
<i>Total</i>	4,744	9,395	11,193	16,027	11,282	3.65%
<i>Break Bulk ('000 Tons)</i>						
General Cargo	1,287	1,743	1,834	2,547	1,261	2.03%
<i>RoRo ('000 Vehicles)</i>						
Domestic	63	131	145	236	172	3.94%
Transshipment	151	100	113	222	71	1.14%
<i>Total</i>	214	231	258	458	243	2.26%

Each of the commodities are detailed in this document. As containerised cargo is the largest component these are here further detailed below.

Container Forecast Results

The container forecast for Sri Lanka is presented in the Base Case and in the High Case. Under the Base case the total volume is expected to grow from 5.6 M TEU in 2016 to 16.4 M TEU in 2050. Under the High Case the traffic is expected to increase to 25.5 M TEU by 2050.

Table 1-23 Base Case Container Forecast

Base Case		2016	2020	2025	2030	2050
Gateway Demand	'000 TEU	1,300	1,660	2,197	2,630	3,737
TS Demand	'000 TEU	4,355	5,775	5,873	6,433	12,671
Total	'000 TEU	5,655	7,435	8,070	9,063	16,408

Table 1-24 High Case Container Forecast

High Case		2016	2020	2025	2030	2050
Gateway Demand	'000 TEU	1,300	1,660	2,252	2,855	4,549
TS Demand	'000 TEU	4,355	6,304	7,311	8,473	20,996
Total	'000 TEU	5,655	7,964	9,563	11,328	25,545

Gateway Container

The forecasts show a strong growth prediction until 2025 after which the scenarios diverge more. This has to do with the GDP per capita development, as differences in the first 5 years are smaller. The growth does flatten after 2040 due to a decrease in industrialisation speed and a stagnant population.

Figure 1-12: National Gateway Throughput Forecasts

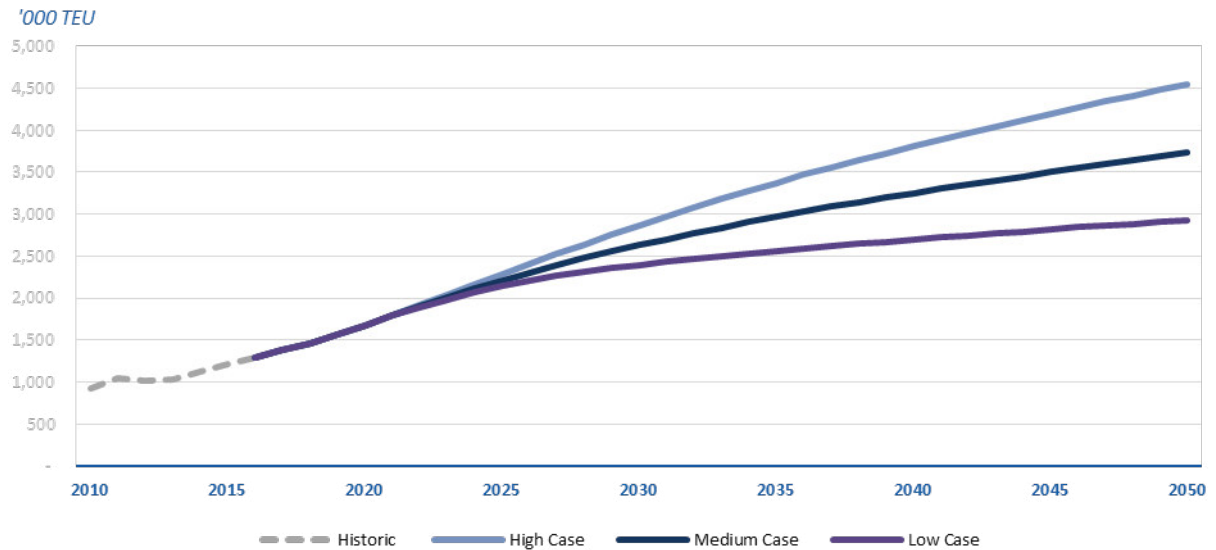


Table 1-25: National Gateway Throughput Forecasts Data Table

'000 TEU	2015	2020	2025	2030	2035	2040	2045	2050
High	1,218	1,660	2,252	2,855	3,368	3,802	4,192	4,549
5yr - CAGR		6.39%	6.29%	4.86%	3.36%	2.45%	1.97%	1.65%
Medium	1,218	1,660	2,197	2,630	2,969	3,254	3,508	3,737
5yr - CAGR		6.39%	5.77%	3.66%	2.46%	1.85%	1.51%	1.28%
Low	1,218	1,660	2,141	2,404	2,572	2,711	2,832	2,938
5yr - CAGR		6.39%	5.22%	2.34%	1.36%	1.06%	0.88%	0.74%

Transshipment Container Forecast

As one of the major cargo segments, the forecast of transshipment container volumes is critical for port development planning. Given the footloose nature of the transshipment business, and the uncertainties concerning the development of transshipment markets, two scenarios have been developed:

- The *Base Case*, where transshipment market experience moderate growth in transshipment demand and Colombo's market share growth decelerates over time, due to pressure from other hub ports.
- The *High Case*, where transshipment demand in Colombo's main transshipment markets grows more rapidly and Colombo is able to retain its dominant position in the region.

As such, the Base Case and High Case scenarios are aimed at reflecting the impact of variations in external factors on transshipment demand, as the container transshipment business is strongly dependent on such external factors. This is in contrast to the economic Low Case, Base Case, and High Case scenarios, as introduced in the previous chapter, which focus mainly on Sri Lanka's internal (economic) development. The table and figures below present the estimated transshipment volumes for both the Base and High Case scenarios.

Table 1-26 Base Case and High Case Container Transhipment Forecast

		2016	2020	2025	2030	2050
Base Case TS Demand	'000 TEU	4,355	5,775	5,873	6,433	12,671
High Case TS Demand	'000 TEU	4,355	6,304	7,311	8,473	20,996

The graph below shows Sri Lanka's total forecast transhipment container throughput under the Base Case, divided by transhipment market. The following observations can be made:

- Annual transhipment volumes are estimated to increase from 3.89 M TEU in 2015 to 12.67 M TEU in 2050.
- A dip in volumes can be observed around 2030, due to the expected implementation of several competitive projects.
- East India, West India and Bangladesh will remain Sri Lanka's key markets for transhipment containers, accounting for an estimated 89.9% of throughput in 2050.
- Due to increasing direct trade shares and increasing pressure from competing transhipment hub groups, growth of transhipment volumes is expected to decelerate after 2035.

Figure 1-13 Base Case Container Transhipment Forecast

Transhipment TEUs

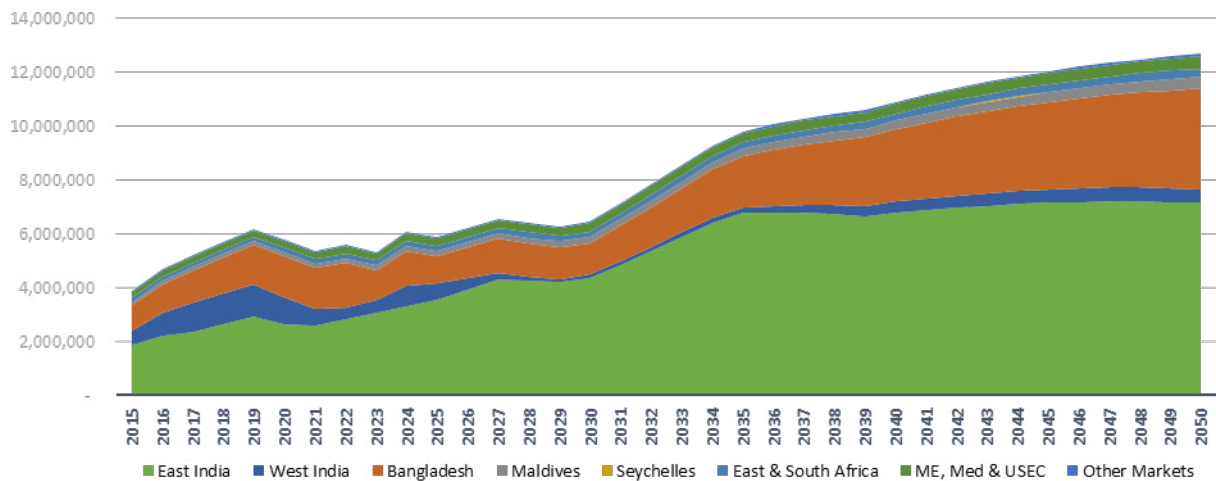
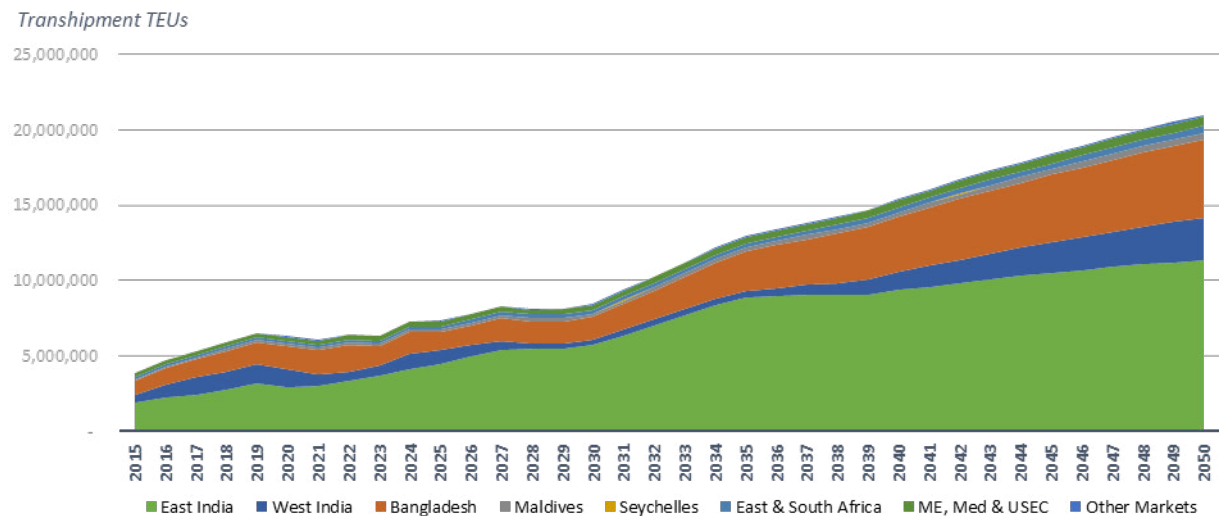


Figure 1-14 High Case Container Transshipment Forecast



Opportunities and Threats

Transshipment cargo is known as footloose cargo, this means that shipping regard the activity as non-captive for the port and are able to transfer the cargo activity to other ports along the service routes depending on cost, geographical position to end-feeder markets, quality of port service and available quay and stack spaces and sufficient water depths.

The table below summarizes key identified opportunities and threats that may impact Sri Lanka's ability to attract transshipment cargo.

Opportunities	Threats
Maritime Hub concept route boosts industrial productivity in Sri Lanka	China developing a more internal focussed economy, resulting in less exports
Geographical position of Port of Colombo serves shipping lines network enlargements developments	A focus on land based silk route developments instead of the maritime silk routes, resulting in decreased maritime trade growth
	Development of the northern passage
	India market to develop its ports faster, resulting in a more rapid decrease in dependency on transshipment
	Indian market becoming a real export market, which directly serves global markets
	War risks in the region, due to conflicts between nations.
	Liberalised cabotage regulations in India make cabotage more favourable, resulting in more competition from Indian ports.

Cargo allocation

For each of the commodities an allocation strategy was applied to make use of both the strengths of the ports as well as the international or regional function of the port.

The following table illustrates the main strengths of the several ports and their natural focus areas:

Table 1-27 Competitive Role of Ports

Ports	Strengths	Specifics	Focus areas
Port of Colombo	Deepwater terminals	Designed for Transshipment of Containers	Transshipment Containers
	Near demanding consumer regions	Western region	Gateway Containers & Logistics
	Attractive for Tourism	City & Port City & access to nation	New Cruise terminal (and marina's in Port City)
	Industrial supplies	Refinery supply, powerstation supply	Liquid Bulk
	Protected berthing for LNG	Planned LNG powerstation	LNG
	Dry Bulk	Limited waterdepths	Cement, Grain and animal feeds
	General cargo	Limited waterdepths	Assign additional quays
Port of Trincomalee	Natural deepwater in protected areas		Ship services and lay-up business
	Hosting Cement and Grain facilities	Private Cement plant Private Grain plant	Dry bulk (grains, cement)
	Strategic oil supply location	Private liquid bulk terminal	Expansion of Liquid Bulk
	City and Region is attractive to tourism	Boating industry to be developed	Marina's and Cruise terminal development
	Demand for power stations	Optional supply of power stations	LNG or gas
	Support regional development	Limited quays	Expansion of quays
	Support regional logistics developments	Optional industrial and logistics areas near rail	Develop industrial and logistics areas
Support new export products and markets	Value added activities in light- and medium industries	Liquid bulks, Dry Bulks and Container traffic	
Hambantota	New port with ample industrial space	Designed for Industry	Refinery, Cement plants Liquid bulk & LNG
	Ample space at break bulk quays	New break bulk terminal	RoRo business, general cargo and break bulk
	Planned shipyards	Opted for ships yards	Shipyards
	Supply regional projects	General cargo & Container trades	General cargo & Project cargo & Containers
	Support regional logistics developments	New container terminal	Container trades
	Support new export products and markets	Value added activities in medium- to heavy industries	Liquid bulks, Dry Bulks and Container traffic

Olivil	Small port on East coast	Limited water depths	Fishery industry and cold chain
	Regional and local function	Limited water depths	Coastal activities, marina
KKS	Proximity to India	Limited water depths	Optional ferries
	Regional and local function	Limited water depths	Coastal activities, marina
Puttalam Coal jetty	Limited waterdepth	System with barges	Coal imports

As container traffic is the most prominent cargo flow, the allocation is here detailed in the summary. Other allocations are expressed in the document under the chapter commodity-level allocation.

Gateway Containers

- Of the total gateway demand, Colombo port is estimated to handle 98% in 2025, 95% in 2030, and 88% in 2050, due to the port's proximity to the consumer market.
- Hambantota port is estimated to handle 1% in 2020, 4% in 2030, and 9% in 2050, due to the envisaged logistics and industrial zone and the port's proximity to main trade routes.
- The remainder of gateway containers are expected to be handled at Trincomalee, which will solely serve its direct hinterland.

Transshipment

Transshipment container volumes are assumed to remain in Colombo during the forecasting period. While Hambantota is geographically better positioned to handle the transshipment cargo, several factors result in a favourable position for Colombo. These factors include Colombo's proximity to consumer markets, which entails that vessels carrying gateway containers will already call Colombo, the presence of the port community in Colombo, the maximum water depth of 17.0m in Hambantota, and the higher number of berths in Colombo.

Under the Base Case, transshipment volumes are expected to increase to 12.7 M TEU by 2050; under the High Case scenario, which assumes stronger growth of destination markets and a stronger value proposition for the port of Colombo, transshipment volumes are expected to increase to 21.0 M TEU by 2050. The table below presents the Base Case container allocation for the Sri Lankan ports.

Table 1-28 Sri Lanka Port Cargo Allocation - Containers

	Current (2016)		2020		2030		2050	
	Volumes ('000 TEU)	Allocation (%)	Volumes ('000 TEU)	Allocation (%)	Volumes ('000 TEU)	Allocation (%)	Volumes ('000 TEU)	Allocation (%)
Gateway								
Colombo	1,300	100%	1,643	99%	2,498	95%	3,289	88%
Trincomalee	-	-	-	-	26	1%	112	3%
Hambantota	-	-	17	1%	105	4%	336	9%
Other Ports	-	-	-	-	-	-	-	-
National Demand	1,300	100%	1,660	100%	2,630	100%	3,737	100%
Transshipment								

	Current (2016)		2020		2030		2050	
	Volumes ('000 TEU)	Allocation (%)	Volumes ('000 TEU)	Allocation (%)	Volumes ('000 TEU)	Allocation (%)	Volumes ('000 TEU)	Allocation (%)
Colombo	4,355	100%	5,775	100%	6,433	100%	12,671	100%
Trincomalee	-	-	-	-	-	-	-	-
Hambantota	-	-	-	-	-	-	-	-
Other Ports	-	-	-	-	-	-	-	-
National Demand	4,355	100%	5,775	100%	6,433	100%	12,671	100%
Total								
Colombo	5,655	100%	7,418	100%	8,931	99%	15,960	97%
Trincomalee	-	-	-	-	26	0.4%	112	1%
Hambantota	-	-	17	0%	105	0.6%	336	2%
Other Ports	-	-	-	-	-	-	-	-
National Demand	5,655*	100%	7,435	100%	9,063	100%	16,408	100%

* Excludes 79,812 TEUs that were re-stowed.

Container Development needs

Colombo

Figure 1-15 displays the expected container volumes under the Base Case and High Case, with the current capacity in the Port of Colombo. The graphic shows that there is a large demand for additional port development to fill the gap.

Figure 1-15 Container Demand and Existing Capacity Supply – Colombo Current Facilities

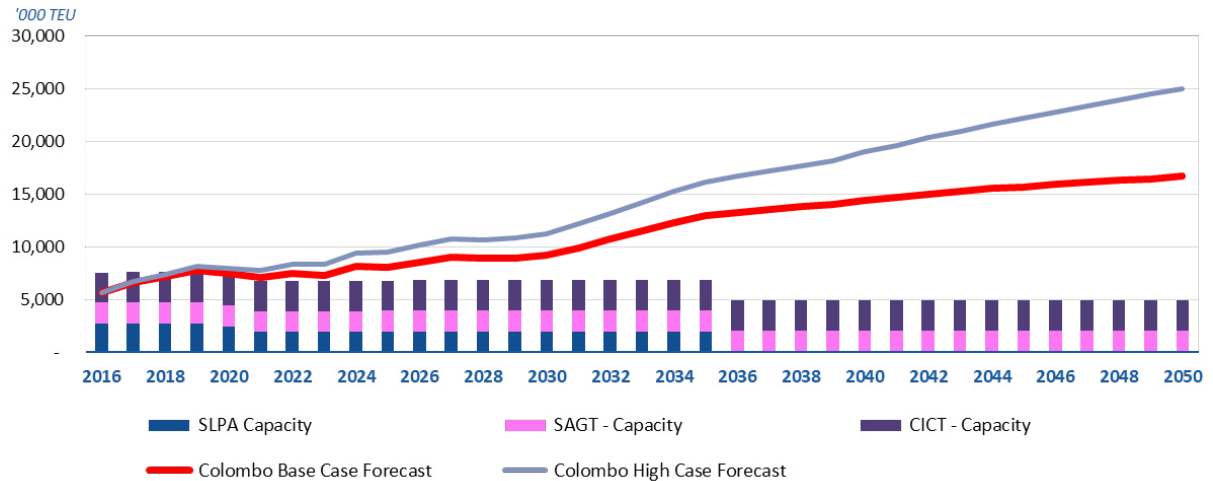


Table 1-29 Container Capacity Supply Gap

		2016	2020	2025	2030	2050
Base Case						
Demand	'000 TEU	5,655	7,418	8,026	8,931	15,960
Capacity	'000 TEU	7,500	7,294	6,789	6,806	4,948
Capacity Gap	'000 TEU	1,845	(124)	(1,237)	(2,125)	(11,012)
High Case						
Demand	'000 TEU	5,655	7,947	9,518	11,186	24,998
Capacity	'000 TEU	7,500	7,294	6,789	6,806	4,948
Capacity Gap	'000 TEU	1,845	(653)	(2,729)	(4,380)	(20,050)

Subsequently, Table 1-30 displays the envisaged development options of Colombo. The extension of WCT to WCT II is highly costly⁴ and is only considered in the full port development option in the gap analysis, as other options are more cost effective. Table 1-33 identifies several development scenarios that comprise several of the facilities presented in Table 1-30.

Table 1-30 2050 Container Capacity Development Options - Colombo

Facility	Capacity ('000 TEU)	Quay (m)
Current Facilities (2050)		
SAGT I	2,068*	940
CICT	2,880*	1,200
Development Options (2050)		
WCT I	3,360	1,400
WCT II	3,360	1,400
ECT I	2,880	1,200
ECT II	1,440	600
SAGT II	2,640	1,200
North Port	6,120	2,550

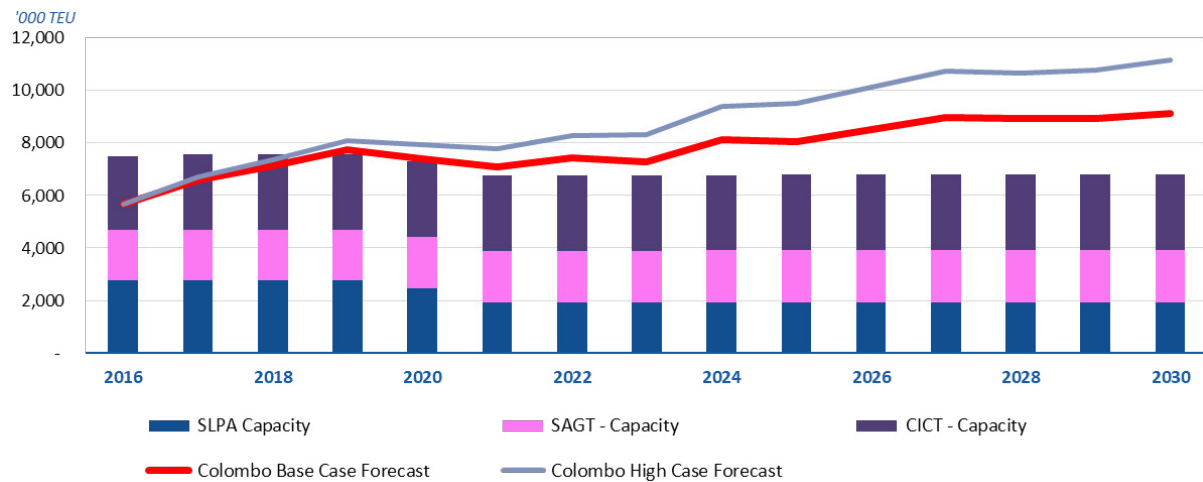
*Assuming an increase in productivity.

⁴ The breakwater needs to be removed and a new breakwater needs to be developed

Port of Colombo in 2030

Figure 1-16 displays the expected 2030 container volumes demand under the Base Case and High Case, in relation to the existing capacity in the Port of Colombo. This shows a clear and urgent demand for development.

Figure 1-16 2030 Container Demand and Existing Capacity Supply – Colombo Current Facilities



The capacity gaps in TEU (2030) are illustrated in next table.

Table 1-31 Container Capacity Supply Gap

		2016	2020	2025	2030
Base Case					
Demand	'000 TEU	5,655	7,418	8,026	8,931
Capacity	'000 TEU	7,500	7,294	6,789	6,806
Capacity Gap	'000 TEU	1,845	(124)	(1,237)	(2,125)
High Case					
Demand	'000 TEU	5,655	7,947	9,518	11,186
Capacity	'000 TEU	7,500	7,294	6,789	6,806
Capacity Gap	'000 TEU	1,845	(653)	(2,729)	(4,380)

Subsequently, Table 1-32 displays the envisaged development options of Colombo. Under the Base Case forecast, the nearly completed ECT Phase I should provide adequate capacity. Under the High Case forecast, the second phase of the ECT terminal is required; alternatively, the first phase of the WCT could be developed.

Table 1-32 2030 Container Capacity Development Options - Colombo

Facility	Capacity ('000 TEU)	Quay (m)
Current Facilities (2030)		
SLPA	1,928	1,292
SAGT I	1,999*	940

CICT	2,880*	1,200
Development Options (2030)		
WCT I	3,360	1,400
WCT II	3,360	1,400
ECT I	2,880	1,200
ECT II	1,440	600
SAGT II	2,640	1,200

*Assuming an increase in productivity.

Port of Colombo in 2050

The following tables illustrate the situation in 2050.

Table 1-33: 2050 Container Capacity Development Scenarios - Colombo

Facility	SAGT I	CICT	WCT I	WCT II	ECT I	ECT II	SAGT II	North Port	Capacity ('000 TEU)	Quay (m)
Capacity Development Scenarios										
1. Current Facilities	x	x							4,948	2,140
2. Current & Planned	x	x	x		x				11,188	4,740
3. Current, Planned & Extended ECT + SAGT	x	x	x		x	x	x		15,268	6,540
4. Current, Planned & North Port	x	x	x		x			x	16,588	6,990
5. Full Port Development	x	x	x	x	x	x	x	x	24,028	10,190

Table 1-34 displays the container capacity gap analysis based on the estimated 2050 container volumes and the capacity development scenarios presented above. Red indicates a capacity shortage; orange indicates a deficit within the margin of error of 10%; and green indicates a capacity surplus.

The following table shows the TEU capacity gap by 2050 and is an indicator for the capacity required to be developed.

Table 1-34: TEU Gap Analysis Colombo 2050

	Unit	Base Case	High Case
1. Current Facilities	'000 TEU	(11,726)	(20,050)
2. Current & Planned	'000 TEU	(4,772)	(13,810)
3. Current, Planned & Extended ECT + SAGT	'000 TEU	(6,92)	(9,730)
4. Current, Planned & North Port	'000 TEU	628	(8,410)
5. Full Port Development	'000 TEU	8,068	(970)

The main conclusions from the analysis are:

- The future capacities of SAGT, WCT I, CICT and ECT (scenario 2: current and planned facilities) are insufficient for Colombo under the Base Case.

- Under the High Case scenario, which entails higher transshipment volumes for the Port of Colombo, the north port expansion is required to accommodate all container volumes.
- For both scenarios, the expansion capacities are based on improved handling efficiencies in the future.

Hambantota

Phase II of the Hambantota port development, which includes a container terminal (phase I), is nearing completion. Expansion options still exist for the port. Table 1-35 provides an overview of the forecasted capacity and quay wall requirement, given an assumed 2,400 TEU per metre per annum throughput capacity.

Table 1-35 Container Demand in TEU and Quay Metres for Base and High Case Hambantota

Scenario	2050 Capacity Requirement ('000 TEU)	2050 Quay wall Requirement (m)
Base Case Scenario	336	330
High Case Scenario	336	330

Subsequently, Table 1-36 displays the envisaged or planned development options at the port of Hambantota. Table 1-37 identifies the development scenarios that comprise several of the facilities planned.

Table 1-36 2050 Container Capacity Development Options - Hambantota

Facility	Capacity ('000 TEU)	Quay (m)
Current Facilities (2050)		
Phase II Container Terminal	3,116	1,299
Development Options (2050)		
Phase IV Container Terminal	9,240	3,850

Table 1-37 2050 Container Capacity Development Scenarios - Hambantota

Facility			Capacity ('000 TEU)	Quay (m)
	Phase II Terminal	Phase IV		
1. Current	x		3,116	1,299
2. Full Port Development	x	x	12,356	5,149

Table 4-47 presents the gap analysis for Hambantota for the Base Case and High Case scenarios, based on estimated 2050 container volumes. The gap analysis yields the following conclusion:

- The current container terminal is sufficient to handle expected demand under both the Base Case and High Case scenarios. Based on this gap analysis, additional container development is not required as it would provide unwanted overcapacity, hence part of phase II container terminal may be used for other purposes in the future.

Table 1-38 TEU Gap Analysis Hambantota

	Unit	Base Case	High Case
1. Current Facilities	'000 TEU	2,854	2,854
2. Full Development	'000 TEU	12,094	12,094

Trincomalee

Table 4-48 presents the estimated 2050 container volumes and quay wall requirement. The following is concluded:

- A single berth in Trincomalee is sufficient to accommodate estimated future demand.
- No detailed plans for container terminals are considered as projected demand is low.

Table 1-39: Container Demand in TEU and Quay Metres for Base and High Case Trincomalee

Scenario	2050 Volumes ('000 TEU)	2050 Quay Wall Requirement (m)
Base Case	112	300 m
High Case	112	300 m

Other Commodities Development needs

Other commodity development needs are expressed in the table below.

Commodity	Port	2016 Capacity ('000 Tons)	2016 Throughput ('000 Tons)	2050 Forecast Base ('000 Tons)
Coal	Colombo	-	-	-
	Trincomalee	347	103	120
	Hambantota	-	-	-
	Puttalam	2,500	1,836	2,280
	Other Ports	-	-	-
Wheat, Maize, Corn	Colombo	710	190	342
	Trincomalee	1,161	867	1,709
	Hambantota	-	-	228
	Other Ports	-	-	-
Cement, clinker and gypsum	Colombo	2,250	2,179	2,334
	Trincomalee	2,200	1,712	3,113
	Hambantota	-	-	1,556
	Galle	1,000	535	778
	Other Ports	-	-	-
Crude oil	Colombo	6,570	1,685	2,512
	Trincomalee	-	-	-
	Hambantota	-	-	5,007
	Other Ports	-	-	-
Refined Oil	Colombo	4,531	2,871	2,264
	Trincomalee	10,692	238	1,358
	Hambantota	-	21	905

Commodity	Port	2016 Capacity ('000 Tons)	2016 Throughput ('000 Tons)	2050 Forecast Base ('000 Tons)	
Non-Containerized cargo	Other Ports	-	-	-	
	Colombo	2,000	801	555	
	Trincomalee	250	-	832	
	Hambantota	750	399	1,054	
	KKS	125	32	277	
	Oluvil	250	-	28	
	Galle	250	42	28	
	Colombo	84	33	24	
	RoRo	Trincomalee	-	-	-
		Hambantota	515	182	434
LNG	Other Ports	-	-	-	
	Colombo	-	-	1,994	
	Trincomalee	-	-	-	
	Hambantota	-	-	1,994	
	Other Ports	-	-	-	
Fertilisers	Colombo	314	314	-	
	Trincomalee	-	-	1,536	
	Hambantota	-	-	-	
	Other Ports	-	-	-	

Port development plans and Short Term Priority Projects

In this section the port directions are described including the short term priority projects and port plans. In the main text of the documents also the observations and bottlenecks are described.

Colombo port directions

Port of Colombo will be leader in the Indian Ocean, Middle East and East African hub ports, and is to become an efficient logistic hub to attract sustainable investment and trade, to facilitate the national export strategy.

As such, the following threefold focus applies to Port of Colombo:

- Maintaining a World Class Transshipment Hub, serving the Middle East, East Africa, India, Pakistan and the Bay of Bengal;
- Becoming an efficient logistic hub for imports and newly developed exports;
- Becoming a sustainable Port.

Colombo Port is leader in the Indian Ocean as Transshipment Hub port and should stay competitive with other national and international transshipment ports. To achieve this, focus should be on operational excellence both on the marine services, cargo handling services, auxiliary functions and on interterminal traffic. The marine activities and handling activities are one of the core activities of SLPA. Port designs are adjusted and future capacity is planned for in order to stay ahead of demand. Innovations and new technologies will support this development.

The Port of Colombo should also become more efficient to facilitate the National Export Strategy on targeted exports sectors, as well as improving the logistics on import cargoes. As many trades are transported by containers, the container logistics chain is prime focus to become more efficient. This can be catered for through better infrastructure on port and hinterland connections as well as on administration and procedures. The latter can be achieved through a combination of digitalisation through a single maritime window as well as through trade facilitation and improved customs procedures. Further the development of cargo villages or Free Trade Zones (FTZ) connecting to the port should cater for demands on export manufacturers and foreign direct investment (FDI).

The above shows that the port sector needs to move fast on the innovation and efficiency improvements through investments to stay competitive both to support the transshipment Hub as well as the exports visionary. The port of Colombo will be a reliable partner in developing the nation and serving new clients.

Sustainability has become an important element in the global production chain. Global supply chains focus on partners which have a sustainability policy in place. Port of Colombo wants to align with modern practises of sustainability standards and green policies, innovation in the priority export sectors and integrate the logistics operation in the green supply chain.

Port role in the Country

The Port of Colombo is important for Sri Lanka and facilitates the majority of the import and exports trades today. The city is under large developments with the erection of many new hotels and resident flats and the rehabilitation of historic buildings. Furthermore, a new city port is under development, south of the existing port, including hotels, conference centres, residential flats, shops and marinas. The new port city will be connected through an elevated highway that also creates additional entrances to the port. The western region has several plans for city and urban developments and improvements. Combined, the western region developments and the city of Colombo generate high demands for the port of Colombo. This translates to required port improvements, a new cruise terminal, enhanced connectivity and major future port planning both for containers as well as for liquid bulk and multipurpose. Additional demand for warehousing and logistics needs to be captured in future planning as well.

Summary Conclusions

The following table provides a summary of the analyses done in part B for the port of Colombo, followed by the main conclusions from part B.

Figure 1-17: Colombo Summary Table

Commodity	Demand 2016	Demand 2050 (Base Case)	CAGR	Capacity 2016
Containers ('000 TEU)				
Gateway	1,300	3,289	2.8%	
Transshipment	4,355	12,671	3.2%	
Total	5,735*	15,960	3.1%	7,100

Commodity	Demand 2016	Demand 2050 (Base Case)	CAGR	Capacity 2016
Dry Bulk ('000 Tons)				
Coal	-	-	-	-
Wheat / Maize / Corn	190	342	1.7%	710
Cement / Clinker / Gypsum	2,179	2,334	0.2%	2,250
Fertiliser	314	-	-100.0%	-
Biomass	-	-	-	-
Ilmenite	-	-	-	-
Total	2,683	2,676	-0.0%	2,960
Liquid Bulk ('000 Tons)				
Crude Oil	1,685	2,512	1.2%	6,570
Refined Oil	2,871	2,264	-0.7%	4,531
LNG	-	1,994	-	-
Total	4,556	6,770	1.2%	11,101
General Cargo				
Non-containerised General Cargo	801	555	-1.1%	2,000
RoRo ('000 Vehicles)				
RoRo	33	24	-0.9%	84
Cruise				
Vessels	43	207	4.7%	

*Includes 79,812 TEUs that were re-stowed.

Priority Projects Colombo

In order to remedy the most severe issues identified, the following short-term priority projects have been identified for the port of Colombo:

- SP1. **JCT Modernisation Plan** – A modernisation plan must be developed for JCT, to enable the terminal to continue performing container handling operations safely and reliably over the coming years, after which the container activities are to be phased out from the JCT location.
- SP2. **Dedicated berth for grains and cement** – The dedicated berth can solve immediate sea side operations bottle necks and the accompanying depth issues.
- SP3. **PVQ Upgrade Plan** – To handle bigger vessel dredging works might dredging if possible is needed.
- SP4. **Sapugaskanda oil refinery** - Sapugaskanda oil refinery is in poor state and operates near densely populated areas. As such, the oil refinery may need to be revamped and/or relocated.
- SP5. **LNG Storage Facility** - An LNG handling and storage facility is to be developed, to serve the envisioned Kerawalapitya LNG power plant and enable LNG bunkering activities in the port. A floating LNG storage vessel with regassification units on board is recommended. Such a solution would reduce the need for LNG related structures ashore. The pipeline connection to the powerplant should take into consideration the future location of North Port.
- SP6. **UCT Transformation Plan** – A plan should be developed to guide the transformation of UCT towards a general cargo facility, as it is expected that container activities will be phased out in the short term (2020).

- SP7. **An adequate passenger terminal**, with adequate berthing space and a modern passenger building, is to be developed. The preferred location for this development is on the BQ (once the CFS activities have been relocated to the South Harbour). An adequate facility will also enable an efficient passenger arrival process.
- SP8. **Port Gate Upgrade Plan**, including an expansion of the current main gate from 3 in-lanes and 3 out-lanes to 5 in-lanes and 5 out-lanes, and a new gate complex that directly connects the South Harbour to the PAEH.
- SP9. **BQ Warehousing Relocation Plan** – Current Warehouses on BQ need to be relocated to ensure continuation of operations. Additionally, new equipment needs to be procured and a modern Warehouse Management System needs to be adopted.
- SP10. **Mechanical and electric workshops**. – Due to the PAEH project, a number of buildings need to be relocated.
- SP11. **The resettlement of underutilised buildings**
- SP12. **Widening of the port access road** - Port road should be widened to a 6-lane road. In case the PAEH, which will run above the port road, hampers widening of the port road at a later stage, the widening should be carried out before the PAEH is completed.
- SP13. **Port Gate Automation** – Automation of the gate process is an absolute necessity when dealing to achieve port efficiency and alleviation of congestion.
- SP14. **PAEH Simulations** – Traffic simulations are required to help shape the design characteristics of the PAEH.
- SP15. **PAEH Development** - Development should proceed as planned by RDA, with SLPA input on construction issues, ramp locations, and gates locations.
- SP16. **Securing Future Rail Development Path** – A path for optional future rail development towards south port should be secured.
- SP17. **Port Community System** – Port Community System to help data exchange and paperless environment in the port.
- SP18. **North Port Development** – A feasibility study on North Port Development is required including the impacts on the Kelani river outlet.

Colombo Port development plan

Taking into consideration the forecasted demand and planned short-term capacity increases/decreases, the table below summarizes the capacity requirements for each of the commodity groups.

Table 1-40 Capacity Development Requirement Colombo

Commodity	Capacity Development Requirement
Containers	<p>2025 – By 2025, 883m of additional quay is required.</p> <p>2030 – By 2030, 1,735m of additional quay is required, including the 883m that is required by 2025.</p> <p>2050 – By 2050, 8,075m of additional quay is required, including the 1,735m that is required by 2030</p>
Dry Bulk	<p>2025 – In the immediate future, cement operations need a dedicated berth with a depth of 13.5m, to accommodate a design vessel with a draft of 12.5m.</p> <p>2030 & 2050 – Stabilisation of demand, no additional capacity needed.</p>
Liquid Bulk	<p>2025 – LNG handling and storage facilities are required immediately to avoid operational delays of the new gas-fired power plant. Additionally, new refining capacity is required and the old pipelines need to be renewed.</p> <p>2030 – Possible relocation of the dolphin jetty, in case of North Port construction and operations.</p> <p>2050 – No additional capacity requirements.</p>
General Cargo	<p>2025 – Development of JCT berth 1 for general cargo.</p> <p>2030 – Dedicated multipurpose terminal to handle general cargo and RoRo.</p>

Commodity	Capacity Development Requirement
	2050 – No additional capacity needed.
RoRo	2025 – UCT needs to be transformed into a dedicated general cargo and RoRo facility. 2030 – Dedicated multipurpose terminal to handle general cargo and RoRo. 2050 – No additional capacity needed.

In order to meet the future Base Case capacity demand, the following two port layouts have been developed:

- South Port Max – The South Port Max design is based on the SLPA concept of the current South harbour basin development. The “South Port Max” concept incorporates this design with a wave protection on the north side of the port. This wave protection can be expanded to a break water if expansion of the port area is needed. This concept includes the extension of the current south port break water. In contrast to SLPA concepts, the envisaged West Container Terminal I and West Container Terminal II should have a quay length of 1,400 m, in order to enable accommodation of 3 mega vessels simultaneously.
- North Port Large – The North Port Large option creates the necessary space through a design that is based on the original SLPA North Port concept. Besides meeting cargo capacity demand, the development option will offer sufficient space for logistics development near the quay side. As the western breakwater is not extended, the angle of the northern breakwater is adjusted to bring it in line with the western breakwater. An underwater guide pier should direct sedimentation from the river estuary further to the north.

The figures below visualise the two long term development layouts.

Figure 1-18 Colombo Long Term Design - South Port Max



Figure 1-19 Colombo Long Term Design - North Port Large



In order to identify the preferred development option, a multi criteria analysis has been carried out. The table below summarizes the scores of the two development options; based on these scores, the South Port Max design is selected as the preferred long term development plan for Colombo Port.

Category	Score South Port Max	Score North Port Large
Capacity creation	0.9	0.6
Development flexibility	2.2	0.4
Terminal & port aspects	0.6	1.4
Manoeuvrability	1.3	0.7
Social & environmental impact	1.4	0.6
Final Score (weighted average)	6.4	3.7




In order to develop the port in line with increasing demand, a phased approach has been adopted towards the final 2050 South Port Max design. Specifically, additional layouts have been prepared for the short term (2025) and the medium term (2030). These two intermediate phases are visualised in the figure below.

Figure 1-20 Colombo South Port Max Phasing - 2025 (Left) and 2030



Potential of North Port development

South Port Max layout is based on the base case scenario in 2050 in the cargo forecast. North Port development is required only when unforeseen developments needs (or high case situation) emerge in the future. North Port development requires comprehensive technical and operational considerations, including vessel manoeuvring, water calmness in the basins, siltation, sand drift, flood- and river flows to determine its alignment (angle with the coast line) and layout. Some potential development options are preliminary assessed; these options are presented in the table below. Each option has its characteristics and of which pro and cons needs to be assessed during detailed studies.

Category	Assessment & Discussion Design		
	Energy Hub Concept	JICA Recommendation	SLPA Concept
			
Terminal & Ports Aspects	Aims at energy hub (liquid bulk) combined with containers, general cargo, RoRo and logistics	Aims at liquid bulk, containers, multi purpose and logistics through an island development	Aims at containers and liquid bulk with less space for logistics
Special feature	Energy hub can be developed as a standalone island in early phases. Bridge towards the North	Island with bridges towards North and South. Island can be developed with or without expanding south port	Bridge towards the North

Trincomalee port directions

Trincomalee has development potential due to its key strength of a protected natural bay with deep waters. It is the place of choice for bulk goods servicing the energy and production sector with a focus on the Bay of Bengal.

Trincomalee is a natural deep water port in eastern part of Sri Lanka. It is therefore ultimately well positioned to handle dry bulk cargoes for the country. Especially in connection to the planned corridor development and rail connections the port can emerge as important dry bulk and general cargo port. The establishment of a refinery and power stations would create an additional node in Sri Lankan industrial development.

Several key developments impact the success of the port of Trincomalee, among the most important is the development of the Colombo – Trincomalee corridor to ensure hinterland access to the port. Linked to that is the railway connection to the hinterland to ensure access and distribution of bulk goods to country. For Trincomalee to attract industries of its own, substantial effort should be placed in targeting investors in specific markets.

Summary Conclusions

The following table provides a summary of the analyses done in part B for the port of Trincomalee followed by priority projects.

Figure 1-21: Trincomalee Summary Table

Commodity	Demand 2016	Demand 2050 (Base Case)	CAGR	Capacity 2016
Containers ('000 TEU)				
Gateway	-	112	-	-
Transshipment	-	-	-	-
Total	-	112	-	-
Dry Bulk ('000 Tons)				
Coal	103	120	0.5%	347
Wheat / Maize / Corn	867	1,709	2.0%	1,161
Cement / Clinker / Gypsum	1,712	3,113	1.8%	2,200
Fertiliser	-	1,536	-	-
Biomass	-	500	-	-
Ilmenite	-	700	-	-
Total	2,682	7,678	3.1%	3,708
Liquid Bulk ('000 Tons)				
Crude Oil	-	-	-	-
Refined Oil	238	1,358	5.3%	10,692
LNG	-	-	-	-
Total	238	1,358	5.3%	10,692

General Cargo					
Non-containerised General Cargo	-	832	-	-	-
RoRo ('000 Vehicles)					
RoRo	-	-	-	-	-
Cruise					
Vessels	No data	21	-	-	-

Priority Projects Trincomalee

In order to remedy the most severe issues identified, the following short-term priority projects have been identified for the port of Trincomalee:

- SP1. **Ashroff Jetty Upgrade Phase 1** - A belt system is needed to reduce inefficiencies of trucking to the Ashroff Jetty and to accommodate future cargoes. Land reclamation, the extension of the quay, new road development, new equipment amongst other should be included in the plans.
- SP2. **Navigation Aids** - For night time navigation the ports needs lights, buoys and lighthouses to ensure safety. Maintenance can be outsourced to private parties. SLPA will be remunerated for these costs by increased traffic to the port for which it will receive port dues.
- SP3. **Port Access Road Development** - A road connection starting from A15 near Lanka IOC heading North West will make it possible for port traffic to bypass the city traffic to A6.
- SP4. **Rehabilitation and Extension of the Rail Connection** to the Ashroff Jetty
- SP5. Make **promotional plan** on land and connectivity for newly assigned industrial and logistics.
- SP6. **SLPA Land Use Plan** - The Trincomalee Port Zoning Report is a step in identifying the ports future needs to continue to think about which lands are lands need to be uninhabited for port development. A displacement plan, set-up years in advance will ensure a smooth process.

Trincomalee Port development plan

Ashroff Jetty

The proposed expansion of the Ashroff Jetty follows twee phases, adding two berths. The proposed shape is different from the SLPA development plans as it follows the natural depth of the water on the eastern side and tries to limit quay construction in shallow waters on the western side. The railway expansion from China Bay station is a necessity in order accommodate dry bulk transport to the Sri Lankan hinterland.

Figure 1-22: Expansion Ashroff, Railway and TTA



A	Phase 1 Ashroff Jetty expansion	F	Possible location coal stock pile
B	Phase 2 Ashroff Jetty expansion	G	SLPA land plot FVP 17
C	100m service jetty for tug boats	H	Rail expansion from China Bay station to Ashroff
D	Land reclamation	I	New road development
E	Service pier (-3m CD)		

Deep-water Oil Jetty

Due to the water depth constraint at Trincomalee jetty 3 (CD -11.5 m) the SLPA berthing facility can handle small tankers up to 45,000 DWT. Larger vessels are currently sailing to Colombo and Trincomalee is then opted as secondary discharge port. A new deep-water jetty could accommodate large mainline vessels of 50,000 to 80,000 DWT. This would enhance the economies of scale and have a positive effect on the purchase price of fuels in the nation.

The Jetty

Characteristics of the new jetty:

- Deep-water jetty of CD -18 m⁵;
- Able to handle 80,000 DWT mainline vessels;
- Open jetty construction with service people walking about the jetty;
- Location at the end of prima flour;
- Maybe emergency response vehicles should be able to cross the jetty; then a regular steel construction is not sufficient;
- Pipelines exposed above ground to enable regular environmental checks and maintenance.

⁵ It should be noted that in the proposed location about CD -18m water depth is available. The waterdepth required for a 80,000 DWT vessels would be around 15m.

Figure 1-23: Deep-water Oil Jetty



Ship Lay-up

The deep-water Trincomalee bay offers enough area for ship lay-up if SLPA deems the business case positive. The term ‘ships laid-up’ means ships which are temporarily idle due to lack of cargo or which are temporarily phased out of commercial operations. Ships are laid-up when freight rates are not sufficient to cover the running costs. During times of economic crisis, laying-up is often preferred to the sale of the ship.

Figure 1-24: Locations for Ship Lay-up



Connectivity

The existing railway line currently reaches the private facilities of Prima Flour and Tokyo Cement heading west. The expansion of the railway to Ashroff Jetty is essential for smooth operations at the jetty. The shunting yard next to the port needs expansion space as well, if possible.

The port is connected by road to the east coast of Sri Lanka through the A15 and heart of the country in the direction of Colombo through the A6. Currently, the area west of the port lacks sufficient connection for it to be developed. A connection starting from A15 near Lanka IOC heading north west will make it possible for port traffic to bypass the city traffic to A6. The land between road and rail can be used for industrial development.