Port Rationalization Study for Trinidad and Tobago
Executive Summary

This Port Rationalization Study presents a comprehensive assessment of the maritime and port industries in the Caribbean region and the role of Trinidad and Tobago’s (T&T) ports in the container trade with the intention of providing a basis for the a cohesive and rational strategy for the future development of the maritime sector in T&T. The Ministry of Planning and Sustainable Development and its advisory entity, the Economic Development Board (EDB), contracted Nathan Associates Inc. to provide this study. Due to T&T’s geographic location in the Caribbean and relatively near the Panama Canal, the analysis goes beyond merely reviewing direct trade related to T&T and instead encompasses a greater scope of analysis that includes the regional maritime sector and transshipment in the Caribbean and global trade and container shipping trends affected by the expansion of the Panama Canal.

Trinidad & Tobago Port Background:

T&T currently has two major ports that service container trade: the Port of Port of Spain (POS) and the port of Point Lisas. A significant difference between the Port of POS and Point Lisas in terms of trades served is the relative balance between domestic and transshipment trade in Port of POS (although lately transshipment trade is trending to reach 60% of port throughput) and the dominance of domestic trade at Point Lisas. This is the result of the “specialization” of each terminal with Point Lisas serving mainly shipping lines connecting with the US (mainly Florida), the source of most imports, and Port of POS serving larger carriers that use its facilities both for domestic trades and also for regional transshipment.

The Port of Port of Spain (POS) is a business unit of the Port Authority of Trinidad and Tobago. We understood that there were two efforts in recent years to include private sector participation in the Port, but both have failed mainly due to labor objection. Our interviews with POS management and with shipping lines indicate that union rules are considered a major impediment for achieving higher operational performance along with cost savings. Another limitation relates to the channel depth. According to the Pilot Association, the largest ships currently calling POS are full Panamax. The operational performance of POS is not in line of that common in major container terminals and low berth productivity at POS stems from unavailability of enough STS cranes and the low crane productivity. The issue of low productivity at POS was observed as the most critical by all shipping lines interviewed by us. Apparently, the issue has been afflicting POS for long time and therefore extensively addressed in the latest POS Strategic Plan.

Past plans for expanding POS included the construction of two new perpendicular berths that would replace the present port area and another, and a more ambitious plan proposed in the past included the construction of a new port at the East Sea Lots area. It seems to us that both plans are driven mainly by real estate considerations since the existing port, with modest investments, may have sufficient capacity to handle the T&T traffic under any reasonable
demand scenario. Rehabilitating Berth 8 to create a modern post-Panamax berth could add sufficient capacity to handle future demand.

Management recommends that a financial investment / accommodation be made to assist it in effecting the turnaround and sustainability of the cargo handling operations as a matter of high priority”. While not explicitly stated, it seems that the intention in this recommendation is a comprehensive institutional reform leading to some form of privatization, which would follow the trend of most of the Caribbean hubs that are privately operated.

**Point Lisas:** The container terminal in Point Lisas is part of the Point Lisas Industrial Port Development Corporation (PLIDECO). PLIDECO is 51% owned by the National Energy Corporation, an agency of the national government, and 49% by the private sector. It has more efficient operations compared to Port of Spain and is currently operated at near capacity.

**La Brea:** There is no container terminal in La Brea. The proposed Brighton International Terminal is part of a 196-ha industrial park owned by the National Energy Corporation. The site is not developed yet hence there are no facilities and equipment for handling containers there. The proposed La Brea site is much larger than either the expanded POS or Point Lisas. The site may include, in addition to containers, facilities for bulk handling and a service dock for supply boats.

**Trinidad & Tobago and Regional Container Trends:**

As part of the Caribbean, T&T container trade includes a portion of trade for transshipment, but it also has an aspect of domestic trade (imports and exports). Most of the domestic trade handled at T&T ports is import cargo Therefore, port throughput related to domestic cargo is quite dependent on the country's consumption trends and not on export volumes.

In order to be able to create a demand forecast through 2025 for T&T container traffic, an analysis of the various elements that affect container traffic in the region is necessary beyond purely historical T&T container volumes. One of those aspects is assessing container volumes for the Caribbean. As a whole, the Caribbean has experienced a solid increase in port throughput since the 2008-2009 world economic crises. The Caribbean region is host to the main container hubs in the hemisphere where intense transshipment activity occurs to serve all trades in the Americas and the Caribbean. For the Caribbean Islands, Caucedo, Dominican Republic has shown an impressive growth in the last five years. In the Central America sub-region, of course the Panamanian terminals had steady growth but all the other countries have also shown healthy growth rates. In South America, the strong performance of the Colombian ports is significant.

Since shipping services of T&T are part of those serving the Caribbean Region, the Caribbean shipping services are, in turn, part of a wider network of shipping services that connect the main world’s regions. Hence, the report provides a comprehensive review of how shipping lines deploy their services as part of the world’s services in the region and how the region ports compete for this trade. These services connect Asia with the East Coast of North America (ECNA) and the East Coast of South America (ECSA).
Effects of the Panama Canal Expansion:

The goal of the Panama Canal Expansion was twofold: providing additional transiting capacity and allowing the transit of larger ships. The expansion includes construction of a third set of locks along with new access channels and raising the water level of Gatun Lake. The question of the impact of the 2015 expansion has been the subject of extensive discussions in professional literature and public conferences. There are two opposing views on the subjects. One view is that the expansion will be a “game changer”, meaning substantial increase in trade and related activities in Panama, US and the Caribbean Region. The counter view, shared by most independent experts and shipping lines, argues that the Canal expansion by itself cannot generate a new trade activity. The expansion will simply be a shift back of services to the Panama Canal the cost of crossing the canal will be reduced.

Another, equally important impact of the expansion will be on ship size. It seems that on this topic there is a general agreement. The change in the ship size for services utilizing the Panama Canal will take place in two stages: the First Post-Expansion Period would have a deployment of 8,000-9,000 TEU ships and a later Second Post-Expansion Period would have a deployment of 13,000-TEU ships. The deployment of 13,000-TEU may provide substantial transshipment opportunities for Caribbean hub ports since the major US East and Gulf Coast ports are designed to handle the 8,000-TEU ships – but not the 13,000-TEU ones.

However, any of the effects of the expansion of the Panama Canal are unlikely to affect T&T very much. For a service to use a T&T Port as the primary transshipment port for Panama Canal shipments involves a huge deviation of about 1,500 nautical miles. Moreover, T&T is located too far to the south to serve as a transshipment hub for North American ports. We therefore believe that that the possibility of attracting more business to T&T because of the Panama Canal expansion can be ruled out from further analysis.

T&T and Caribbean Main Shipping Services

T&T shipping services are a part of shipping lines that service the Caribbean, and therefore an analysis of the trends in services globally is required to forecast the impact for T&T ports. There are several trends, unrelated to the Canal expansion, which may provide T&T with transshipment opportunities. The Through-Caribbean services are longer than the respective Caribbean Specialist services and also serve larger trading regions. Therefore, the Through-Caribbean services employ larger and more economical ships than the Caribbean Specialist services. As evidenced by rationalization in service pattern in other world’s regions, it is quite likely that the Caribbean Specialist will be consolidated into the larger Through-Caribbean services which, in turn, will employ larger ships. This consolidation also will generate transshipment potential for T&T ports, assuming they have the right facilities to efficiently handle the larger ships of the Through-Caribbean services.

However, the replacement of Caribbean Specialists by Through-Caribbean could also work against T&T. For example services that call to T&T could be replaced by a future service that traverses the Panama Canal based on post-Panamax ships feeding the Caribbean Region through Panama Atlantic hubs. The future rationalization of services and related change in service pattern could generate additional transshipment traffic for T&T; alternatively, the
rationalization result in a major decline in T&T’s transshipment traffic. There is inherent uncertainty in transshipment traffic.

T&T location to the south of the Eastern Caribbean is not conducive for turning the Island into a regional transshipment hub relative to the US/Caribbean trade. Still, having modern port facilities may induce shipping lines to use it as a hub for the adjacent islands, Suriname and Guyana, and Venezuela (although Venezuela’s transshipment needs and port situation may change with investment).

**Analysis of Competing Container Facilities:**

Shipping lines prefer to conduct their transshipment activity, regardless of type, at hub ports with substantial domestic traffic. Serving the domestic cargo by direct calling saves the cost of transshipping for the domestic traffic and improves the level of service to it. Another advantage is the scale economies in production of port services due to the larger traffic volume. Ports that are in direct or indirect competition with T&T ports for the transshipment traffic can be divided into two groups: Caribbean Hub Ports (ports in which most of the Caribbean transshipment traffic is presently handled); and Neighboring Ports (ports in Eastern Caribbean Islands presently federe through T&T ports).

Caribbean hub ports include: Kingston; Jamaica; Caucedo, Dominican Republic; Cartagena, Colombia; Freeport, Bahamas; Panama Atlantic ports; Moin, Costa Rica; Mariel, Cuba; and Ponce, Puerto Rico.

Jamaica has plans for investment and aims to become a major logistics hub in the area, but is currently inefficient. Caucedo is a high efficient and modern terminal with large volumes of both domestic and transshipment cargo. Cartagena has become more specialized and also splits between domestic traffic and transshipment, with a large share of transshipment cargo destined to Venezuela. Bahamas is a pure transshipment port with almost no domestic cargo.

Neighboring present and potential feedering ports include Pointe-à-Pitre, Guadeloupe; Fort de France, Martinique and Puerto Cabello, Venezuela.

**Ship Size Evolution and Implications for T&T**

The analysis of fleet composition and ship ownership above indicates two related trends:

- Increase in ship size, especially in the post-Panamax categories; and
- Increase in market concentration, with shipping lines organizing themselves in alliances and the alliances controlling almost the entire fleet.

A major reason underlying the recent restructuring of the liner shipping industry and the emergence of super-alliances is a prolonged imbalance between supply and demand, resulting in deterioration of freight rates and substantial losses to shipping lines.

In the case of the Caribbean, the ships employed on most mainline services, are expected to be Post II. Accordingly, ports aspiring to become hub ports should be able to handle Post II ships in a productive and cost effective manner. The future of T&T role as a hub is intertwined with its ability to attract Through-Caribbean services. None of these services is presently
calling T&T, however. Once the Canal is expanded, Post II ships will also be deployed on Through-Canal services. Consequently, if T&T aspires to retain and enhance its role as a regional hub, its ports should have the capability to handle Post II ships of 7,500 – 10,000 TEUs in the near future and NPX of 13,000 TEUs in the long future.

Supply/Demand Balance for the Caribbean Region

The present capacity of the Caribbean ports is higher by about 31% than their present traffic, indicating that there is no shortage of capacity in the Caribbean Region (combined capacity of the all of the present relevant ports is 12.23 million TEUS compared to their present traffic of 9.39 million TEUs). This level of overcapacity is common in the port industry; it definitely does not indicate any shortage of capacity. Moreover, in our review of each of ports we noted that additional capacity could be provided in a relatively short period in the cases of Kingston, Caucedo and Cartagena. We also observe that this is the case in POS, but not in Point Lisas.

The future situation is markedly different. The planned capacity expansion projects will add 14.95 million TEUs of capacity, 122% of the existing one. Accordingly, if all projects listed by the various ports are realized within 3-5 years, their capacity will be 261% of present throughput. We do not expect, however, that all the expansion projects listed in this figure and described in the preceding sections will be realized. Nevertheless, serious overcapacity situation is expected in the future.

The more relevant supply/demand analysis to T&T ports should specifically relate to the three feeding ranges included in T&T’s catchment area: Eastern Caribbean, Surinam/Guyana/North Brazil, and Venezuela. In each feeding range, T&T faces competition from different ports that have overlapping areas they could serve.

T&T Demand Forecast to 2025

The analysis of the supply/demand relationship that determined that supply, or port capacity, substantially exceeds demand, or port traffic, in both the Caribbean Region as a whole and in the specific feeding ranges that T&T presently or potentially serves. Moreover, it seems that the over-capacity situation is bound to exacerbate in the future as many Caribbean ports, fueled by the Canal-expansion-related expectations, will launch ambitious development plans. In light of the over-capacity situation, forecasting T&T transshipment cannot be based on a simple comparison between supply and demand.

T&T has captured about 200,000 TEUs of transshipment in recent years – despite the oversupply situation and the fierce competition for transshipment, and despite T&T ill-equipped port facilities. This reflects the relative advantage that T&T possess in its present feeding ranges, the Eastern Caribbean and Eastern NCSA. This advantage, in turn, stems from T&T geographical position relative to the shipping lanes and its relatively-large domestic cargo base. Our forecasting methodology is based on defining reasonable assumptions regarding these factors.

The scenarios created for the Demand Forecast only relate to the impact of factors outside T&T ports. The implicit assumption in our forecast is that T&T ports will have Post II capability, productive and cost effective operations, and the capacity to handle the additional
transshipment and domestic traffic. If T&T ports remain unchanged, it is quite likely that T&T will lose its present status as a secondary hub ports.

**Figure 1: Forecast Model’s Results**

<table>
<thead>
<tr>
<th>Scenario</th>
<th>Type of Traffic</th>
<th>2012</th>
<th>2018</th>
<th>2025</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>MTEU</td>
<td>CAGR</td>
<td>MTEU</td>
<td>CAGR</td>
</tr>
<tr>
<td>Base</td>
<td>Domestic</td>
<td>0.33</td>
<td>1.31%</td>
<td>0.36</td>
</tr>
<tr>
<td></td>
<td>Transhipment</td>
<td>0.24</td>
<td>1.31%</td>
<td>0.26</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>0.57</td>
<td>0.62</td>
<td>0.81</td>
</tr>
<tr>
<td>High</td>
<td>Domestic</td>
<td>0.33</td>
<td>1.87%</td>
<td>0.37</td>
</tr>
<tr>
<td></td>
<td>Transhipment</td>
<td>0.24</td>
<td>1.87%</td>
<td>0.53</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>0.57</td>
<td>0.89</td>
<td>1.12</td>
</tr>
<tr>
<td>Low</td>
<td>Domestic</td>
<td>0.33</td>
<td>0.75%</td>
<td>0.35</td>
</tr>
<tr>
<td></td>
<td>Transhipment</td>
<td>0.24</td>
<td>0.75%</td>
<td>0.19</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>0.57</td>
<td>0.53</td>
<td>0.62</td>
</tr>
</tbody>
</table>

The results of our forecasting models for 2025 as seen in above are:

- High-Growth Scenario – a total of 1.12 million TEUs consisting of 460,000 TEUs domestic and 660,000 TEUs transshipment;
- Base-Line Scenario – a total of 810,000 TEUs consisting of 470,000 TEUs domestic and 340,000 TEUs transshipment; and
- Low-Growth Scenario – a total of 620,000 million TEUs consisting of 400,000 TEUs domestic and 220,000 TEUs transshipment.

**Conclusion vis-à-vis Trinidad’s Regional Position and Need for Expansion**

We do not expect a meaningful change in T&T regional position and its role as a secondary hub. Our main observations are:

- Panama Canal expansion will have small impact on the Caribbean Region and even smaller than that on T&T ports.
- The Canal expansion will result in the deployment of Post II ships of 7,500 – 10,000 TEUs on Cross-Canal services to be replace, in the long future, by larger NPX ships of 13,000 TEUs.
- To take advantage of the larger ships, the service pattern of Caribbean services is likely to be transformed from Caribbean Specialist to Through-Caribbean services. The transformation process will also include consolidation (rationalization) of services, which may result in increase in transshipment traffic. Part of the additional transshipment traffic could be captured by T&T ports.
- Demand for transshipment is regionalized with each Caribbean hub port having its “catchment area” consisting of several feeder ing range. Because of the overlapping catchment areas, there is a fierce competition for transshipment traffic among the Caribbean hubs.
- T&T is likely to maintain it present role as a hub ports for its present catchment area, consisting of two feeder ing ranges: the Eastern Caribbean Islands and Eastern NCSA. T&T
may add a third feeder range, Venezuela, if the port situation of this country remains unchanged.

- There is no shortage in port capacity for transshipment in the Caribbean Region, including in ports competing with T&T on the same feeder ranges.

- T&T future transshipment traffic depends, therefore, on the capability, capacity, productivity and cost effectiveness of its ports, which are the prerequisites for our traffic forecast scenarios.

- T&T’s 2025 forecast is for 1.12 million, 810,000 and 620,000 TEUs for the High, Base and Low Growth scenarios.

There are three general options to increase capacity and capability to accommodate the forecasted traffic in T&T’s High-Growth Scenario:

- Rehabilitate POS – modify and extend Berth 8, remove non-essential facilities and activities to off-dock dry port(s), add modern equipment and dredge the access channel to 16m;

- Develop a new port in Point Lisas – construct 600-m of berthage and respective yard area via reclamation and dredge the access channel to 16 m; and

- Develop a new port at La Brea – construct 800-m of berthage with respective yard area on mostly existing area and dredge the access channel to 16 m.

Each of the above options results in the creation of about 800-m STS berth, sufficient for handling ALL the expansion needs of T&T in the High-Growth Scenario. Put differently, T&T traffic forecast can justify only one modern container terminal capable of serving Post II ships. Hence, the strategic decision facing T&T government authorities is which of the above options to pursue.

**T&T Opportunities and Challenges for other Maritime Facilities**

**Ship Repair and Dry Docking:** There is potential for growth for the ship repair sector in Trinidad. The main ship repair locations in the Caribbean (with the exception of Cuba can only accommodate vessels between 20,000 and 23,000 dwt. Specifically in Trinidad, there are five small ship repair companies: CL Marine Limited (CARIDOC), Maritime Preservation Limited, Austal, Inter Isle Construction and Fabrication Limited, and Mariner’s Haven Limited. Most of the facilities are located in the Chaguaramas area. At present there is a private sector proposal for the development of a ship repair dry-dock outfitted with three large size dry-docks capable of handling the largest new Panamax vessels, and their studies have concluded that no viable competition exists in the Americas compared to their Asian counterparts both from the perspective of price and size of ship repair facility.

Normally repair calls occur when a ship is off-hire in which case proximity to the major shipping lanes and the cost of deviation to the dry-dock location is important. The expansion of the Panama Canal could potentially create market opportunities for the shipping and the ship repair industry in the Caribbean, of which T&T could benefit. We recommend further studies by industry experts to develop demand forecasts conduct financial feasibility
assessments, and explore public private partnerships as potential models for further development.

**Yachting and Marina:** T&T’s entry into the tourism market has been recent in relation to the rest of the Caribbean. The emergence of the cruise tourism and yachting subsectors in T&T during the decade of the 1990s must be seen against the backdrop of declining petroleum and petrochemical revenues and implementation of trade liberalization policies aimed at diversifying the economy. The petrochemical economy still creates competition for the allocation of scarce economic resources: the growth in the energy sector of the economy tends to crowd out growth and development of other sectors and subsectors in the economy and vice versa.

In 1991, the small domestic yachting community located along Chaguaramas on the northwestern peninsula of Trinidad experienced a rapid expansion in infrastructure, facilities and services, and arrivals grew consistently until 2000. Since then there arrivals declined for various reasons. Despite these setbacks, the Yachting Industry Team prepared a Strategic Plan for the Yachting, and in 2013 the Yachting Steering Committee (YSC) prepared a Policy and Strategic Plan for the years 2013-2015 entitled ‘Restoring Growth’. The Strategic Plan takes account of the decline in yacht arrivals and the lack of investment in the yachting and marina subsector. The Strategic Plan proposes various strategies to stabilize the decline and restore growth to the yachting and marina subsector, which includes institutional changes and the investment in yachting infrastructure. There are opportunities for Trinidad to grow its yachting and marina sector but it must accompanied with investment in the development of yacht infrastructure and facilities and policies that are synchronized with those goals.

**Trade Facilitation and Customs:** Customs services and the speed of customs procedures for the clearance of import and export consignments play a significant role in a country’s economic progress and development. On average trade transaction costs amount to 10% of the value of the goods traded, which gets passed on to consumers. In particular, in developing countries, trade transaction costs incurred due to border procedures hamper business and economic growth.

The Government of T&T has implemented a customs reform and modernization program to implement the UNCTAD Technical assistance project for the implementation of the Automated System for Customs Data-ASYCUDA World (AW), a computerized electronic data interchange (EDI) and management information system (MIS) with the goal of modernizing customs procedure and performance and lowering transaction costs of border procedures. The implementation of AW has resulted in a comprehensive renovation of the information technology (IT) infrastructure increasing computerization to Customs and traders, facilitating the flow of legitimate trade and providing effective tools to sustain compliance.

While important progress has been made to introduce a new working environment with customs reform, change is always difficult to accept and the reform and modernization project did encounter internal resistance to change and challenges involved in moving away from the abusive old ways and system of overtime. Although AW is operational at all major ports of entry in Trinidad and Tobago, there continues to be operating procedures that remain under manual processing without suitable automation. While T&T is making strides in
improving trade facilitation by implementing AW, there are other opportunities related to customs' procedures and implementation that still have room to improve, but it would require a commitment from the government with policies to enable their implementation.

**Labor Issues and Challenges**: Labor at the two major general cargo ports in T&T are unionized under The Seamen and Waterfront Workers (SWWTU) trade union. They act as the bargaining body responsible for the negotiation of collective at both ports. There have been attempts to institute reform in the management and operations of the POS and improve efficiencies at both ports, but the institutional arrangements that accompanied those reforms were too weak to have any meaningful impact.

In order for there to be an improvement in the industrial relations climate at both ports, there needs to be a greater focus on the collective bargaining process and the execution of collective agreements in a timely manner. The collective bargaining process must be focused beyond the conclusion of negotiation for wages and salaries and compensation benefits to include health and safety issues and best practices and industry benchmarks in order to improve the level of occupational health and safety, performance and productivity at both ports. Issues, such as training and development for port workers and port expansion plans, should include a consensus and feedback from of port labor.
3.3. Future Changes and Transshipment Potential 34
   - Impact of Canal Expansion on Caribbean Services 34
   - Through-Caribbean Supplanting Caribbean Specialists 34
   - Rationalization of the Florida/Caribbean Specialists 35
   - Prospects of Transshipping Venezuela 36

4. Analysis of Competing Container Facilities 38
   - 4.1. General 38
   - 4.2. Productivity 38
     - Port of Spain 39
     - Point Lisas 48
     - La Brea 51
   - 4.3. Categorization of Competing Ports 53
     - Kingston, Jamaica 53
     - Caucedo, Dominican Republic 58
     - Panama Ports Company (PCC), Panama 60
     - Cartagena, Colombia 62
     - Freeport, Bahamas 65
     - Manzanillo International Terminal (MIT), Panama 68
     - Colon Container Terminal (CCT), Panama 70
     - Panama Colon Container Port (PCCP), Panama 72
     - Moin, Costa Rica 73
     - Mariel, Cuba 73
     - Ponce, Puerto Rico 74
     - Pointe-à-Pitre, Guadeloupe 74
     - Puerto Cabello, Venezuela 75
   - 4.4. Summary of Caribbean Hub Ports Capacity vs. Throughput 76
     - Present and Future Capacity 76
     - Transshipment Traffic 77

5. Ship Size Evolution and Implications for T&T 78
   - 5.1. Evolution in Ship Size 78
     - Increase in Ship Size 78
     - Big Ships 80
<table>
<thead>
<tr>
<th>5.2. Trends in Fleet Composition</th>
<th>81</th>
</tr>
</thead>
<tbody>
<tr>
<td>Present Fleet and Orderbook</td>
<td>81</td>
</tr>
<tr>
<td>Ownership of Ships</td>
<td>82</td>
</tr>
<tr>
<td>Overcapacity, Scrapping and Newbuilding</td>
<td>83</td>
</tr>
<tr>
<td>Cascading</td>
<td>83</td>
</tr>
<tr>
<td>5.3. Implications for T&amp;T</td>
<td>84</td>
</tr>
<tr>
<td>Caribbean Specialist Services</td>
<td>84</td>
</tr>
<tr>
<td>Through-Caribbean Services</td>
<td>84</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>6. SWOT Analysis for T&amp;T Facilities</th>
<th>85</th>
</tr>
</thead>
<tbody>
<tr>
<td>6.1. Factors Affecting Selection of Transshipment Hubs</td>
<td>85</td>
</tr>
<tr>
<td>Relay Transshipment</td>
<td>85</td>
</tr>
<tr>
<td>Hub &amp; Spoke Transshipment</td>
<td>85</td>
</tr>
<tr>
<td>Domestic Cargo</td>
<td>86</td>
</tr>
<tr>
<td>Port Facilities</td>
<td>86</td>
</tr>
<tr>
<td>Forced Transshipment</td>
<td>86</td>
</tr>
<tr>
<td>6.2. Categorization of the Caribbean Transshipment Hubs</td>
<td>87</td>
</tr>
<tr>
<td>Panama &amp; Near-Panama Ports</td>
<td>88</td>
</tr>
<tr>
<td>Central Caribbean Ports</td>
<td>89</td>
</tr>
<tr>
<td>Northern Caribbean Ports</td>
<td>90</td>
</tr>
<tr>
<td>Eastern Caribbean Ports</td>
<td>91</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>7. Supply/Demand Balance for the Caribbean Region</th>
<th>93</th>
</tr>
</thead>
<tbody>
<tr>
<td>7.1. Oversupply in the Caribbean Region</td>
<td>93</td>
</tr>
<tr>
<td>7.2. T&amp;T Feeding Ranges</td>
<td>94</td>
</tr>
<tr>
<td>Competition for Eastern Caribbean Transshipment</td>
<td>94</td>
</tr>
<tr>
<td>Competition for Guyana, Surinam and Eastern North Brazil Transshipment</td>
<td>95</td>
</tr>
<tr>
<td>Competition for Venezuela Transshipment</td>
<td>95</td>
</tr>
<tr>
<td>No Shortage of Port Capacity for T&amp;T’s Feeding Ranges</td>
<td>95</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>8. T&amp;T Demand Forecast to 2025</th>
<th>96</th>
</tr>
</thead>
<tbody>
<tr>
<td>8.1. Forecasting Domestic Traffic</td>
<td>96</td>
</tr>
<tr>
<td>8.2. Forecasting Transshipment Traffic</td>
<td>97</td>
</tr>
<tr>
<td>Supply/Demand Balance</td>
<td>97</td>
</tr>
<tr>
<td>Transshipment Scenarios</td>
<td>97</td>
</tr>
<tr>
<td>8.3. Forecasting Model Assumptions and Results</td>
<td>99</td>
</tr>
<tr>
<td>Results of Forecasting Model</td>
<td>99</td>
</tr>
</tbody>
</table>
9. Conclusion vis-à-vis Trinidad’s Regional Position and Need for Expansion 101
   9.1. T&T Regional Position 101
   9.2. Options to Provide Needed Expansion 102

10. T&T Opportunities and Challenges for other Maritime Facilities 103
   10.1. Opportunities for Growth of the Ship Repair Sector 103
       Core demand for dry-docking 103
       Global Shipping Market 105
       Global Ship Repair Market 109
       Caribbean ship repair facilities 113
       Ship Repair Market in Trinidad 114
       Opportunities for Growth and Development 114
       Conclusion for the Ship Repair Sector 115
   10.2. Opportunities for Growth of the Yachting and Marina Sector 115
       Caribbean Tourism Economy and Market 117
       Yachting as Tourism 120
       Yachting and Marina Product Differentiation in the Caribbean 121
       The Trinidad and Tobago Tourism Economy and Market 123
       Employment Generation 127
       The Rise and Fall of Yachting and Marina Infrastructure in Trinidad 128
       Opportunities for Growth and Development of the Yachting and Marina Subsector 131
       Conclusions for the Yachting and Marina Sector 132
   10.3. Customs Reform and Trade Facilitation 133
       Objectives of Customs Reform 133
       Trade Facilitation 136
       Conclusion for Customs Reform and Trade Facilitation 142
   10.4. Labor Issues and Challenges 144
       Industrial Relations at the two major seaports 144
       Industrial Relations, Health and Safety, Performance and Productivity 145
       Port Authority of Trinidad and Tobago 145
       Point Lisas Industrial Port Development Corporation 149
       Outstanding collective agreements 150
       Conclusion for Labor Issues and Challenges 150
ILLUSTRATIONS

Figure 2-1 Port Throughput in the Caribbean Region, 2008-2012 (TEU) 2
Figure 2-2 Port Throughput in the Caribbean Islands, 2008-2012 (TEU) 3
Figure 2-3 Port Throughput in Central America (Caribbean littoral), 2008-2012 (TEU) 3
Figure 2-4 Port Throughput in South America (Caribbean littoral), 2008-2012 (TEU) 4
Figure 2-5 Port Throughput at the Caribbean Main Hubs, 2008-2012 (TEU) 4
Figure 2-6 Port of Port of Spain and Point Lisas Domestic and Transshipment Trades 5
Figure 2-7 Port of Port of Spain Trade Composition 6
Figure 2-8 World Container Trade and GDP Growth Rates 7
Figure 2-9 Growth in U.S. Container Trade and Real GDP: 1995–2008 8
Figure 2-10 Historic Trends for Callao Imports TEU and Peru’s GDP 8
Figure 2-11 Regression Analysis Curve Fit with Historic Data for Buenaventura Container Throughput 9
Figure 2-12 Historic Trends for T&T Domestic Container Trade and GDP 10
Figure 2-13 Historic Trends for T&T Domestic Container Trade and GDP 10
Figure 3-1 Main Patterns of the Asia/ECNA and Asia/ECSA Services 11
Figure 3-2 Coscon Asia/ECNA (AWP) Service 13
Figure 3-3 MOL Asia/ECNA (AWP) Service and related Feeders 13
Figure 3-4 MOL Asia/ECNA (AWS) Service 14
Figure 3-5 Maersk Asia/GCNA (AWP) Service 16
Figure 3-6 Panama’s Existing and New Locks 16
Figure 3-7 AWP Patterns following Panama Canal Expansion 18
Figure 3-8 AWP Deviation for Calling T&T 19
Figure 3-9 Maersk Asia/ECSA Service 20
Figure 3-10 Service Patterns of Through Caribbean Services 22
Figure 3-11 Service Patterns of Caribbean Specialist Services 23
Figure 3-12. CMA-CGM Asia/Caribbean Service 26
Figure 3-13 CMA-CGM ECSA/Caribbean Service 27
Figure 3-14 CMA-CGM ECSA/ECNA Service 27
Figure 3-15. CFS Feeder Network 29
Figure 3-16 X-Press Feeder Network 30
Figure 3-17 Crowley Eastern Caribbean Service 31
Figure 3-18 SeaBoard Eastern Caribbean Service 32
Figure 3-19 Tropical Caribeean Services 33
Figure 3-20 SeaFreight Caribbean Ship 33
Figure 3-21 Conceptual Service Consolidation 35
Figure 4-1 Port of Port of Spain Layout 41
Figure 4-2 Port of Port of Spain’s Berths 41
Figure 4-3 Port of Port of Spain Crane Productivity 42
Figure 4-4 Berth Productivity 44
Figure 4-5 Proposed Standards for Berth and Crane Productivity 44
Figure 4-6 Berth Capacity Indicators 47
Figure 4-7 Expanded Layout of Port of Port of Spain 48
Figure 4-8 Point Lisas Container Terminal 50
Figure 4-9 La Brea Phase I Plan 52
<table>
<thead>
<tr>
<th>Figure</th>
<th>Description</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>4-10</td>
<td>La Brea Phase I &amp; II Plan</td>
<td>52</td>
</tr>
<tr>
<td>4-11</td>
<td>Kingston Present Facilities</td>
<td>55</td>
</tr>
<tr>
<td>4-12</td>
<td>Kingston's Shipping Lines</td>
<td>56</td>
</tr>
<tr>
<td>4-13</td>
<td>Kingston's Expansion Plan</td>
<td>57</td>
</tr>
<tr>
<td>4-14</td>
<td>Caucedo Present and Future Facilities</td>
<td>58</td>
</tr>
<tr>
<td>4-15</td>
<td>Caucedo's Crane and Berth Productivity</td>
<td>59</td>
</tr>
<tr>
<td>4-16</td>
<td>Panama Port Company's Cristobal Facilities</td>
<td>61</td>
</tr>
<tr>
<td>4-17</td>
<td>Cristobal Expansion Plan</td>
<td>61</td>
</tr>
<tr>
<td>4-18</td>
<td>Cartagena's Contecar Terminal Layout</td>
<td>63</td>
</tr>
<tr>
<td>4-19</td>
<td>Cartagena's Berth Productivity</td>
<td>64</td>
</tr>
<tr>
<td>4-20</td>
<td>Cartagena's Traffic Development</td>
<td>65</td>
</tr>
<tr>
<td>4-21</td>
<td>Freeport Present Facilities</td>
<td>67</td>
</tr>
<tr>
<td>4-22</td>
<td>Freeport Expansion Plan</td>
<td>67</td>
</tr>
<tr>
<td>4-23</td>
<td>MIT Present Facilities</td>
<td>69</td>
</tr>
<tr>
<td>4-24</td>
<td>MIT Expansion Plan</td>
<td>69</td>
</tr>
<tr>
<td>4-25</td>
<td>Colon Container Terminal</td>
<td>71</td>
</tr>
<tr>
<td>4-26</td>
<td>Margarita Island Terminal</td>
<td>72</td>
</tr>
<tr>
<td>4-27</td>
<td>Guadeloupe Container Terminal Expansion Plan</td>
<td>75</td>
</tr>
<tr>
<td>4-28</td>
<td>Puerto Cabello Expansion Plan</td>
<td>76</td>
</tr>
<tr>
<td>4-29</td>
<td>Caribbean Ports' Facilities, Expansion and Traffic</td>
<td>77</td>
</tr>
<tr>
<td>5-1</td>
<td>Ship-Size Categorization</td>
<td>78</td>
</tr>
<tr>
<td>5-2</td>
<td>New Panamax (NPX) Design</td>
<td>79</td>
</tr>
<tr>
<td>5-3</td>
<td>18,000-TEU Ship Design</td>
<td>80</td>
</tr>
<tr>
<td>5-4</td>
<td>World's Containerships Composition</td>
<td>81</td>
</tr>
<tr>
<td>5-5</td>
<td>World's Major Shipping Lines</td>
<td>82</td>
</tr>
<tr>
<td>6-1</td>
<td>Caribbean Hub's Catchment Areas</td>
<td>88</td>
</tr>
<tr>
<td>8-1</td>
<td>The Relationships between Traffic and GDP</td>
<td>96</td>
</tr>
<tr>
<td>8-2</td>
<td>T&amp;T Domestic Traffic Forecast</td>
<td>97</td>
</tr>
<tr>
<td>8-3</td>
<td>Forecast Model's Results</td>
<td>99</td>
</tr>
<tr>
<td>10-1</td>
<td>Annual Operating costs (0,000 US$ per year)</td>
<td>104</td>
</tr>
<tr>
<td>10-2</td>
<td>Dry-docking versus operating cost (0,000 US$ per year)</td>
<td>105</td>
</tr>
<tr>
<td>10-3</td>
<td>World fleet by principal vessel types in millions dwt (1980-2013)</td>
<td>106</td>
</tr>
<tr>
<td>10-4</td>
<td>Age distribution of the world merchant fleet by vessel type (% of total ships and dwt) January, 2013</td>
<td>107</td>
</tr>
<tr>
<td>10-5</td>
<td>World Tonnage on order 2000-2013 (000s dwt)</td>
<td>107</td>
</tr>
<tr>
<td>10-6</td>
<td>Deliveries of newbuildings major type and country of build (000s GT) in 2012</td>
<td>108</td>
</tr>
<tr>
<td>10-7</td>
<td>Tonnage reported sold for demolition by country where demolished (000s GT) in 2012</td>
<td>108</td>
</tr>
<tr>
<td>10-8</td>
<td>Tonnage utilization by vessel type (% dwt) Jan 2013</td>
<td>109</td>
</tr>
<tr>
<td>10-9</td>
<td>Large Dock Distribution</td>
<td>110</td>
</tr>
<tr>
<td>10-10</td>
<td>Main Dry-dock distribution by size</td>
<td>110</td>
</tr>
<tr>
<td>10-11</td>
<td>Main Caribbean Shipping Facilities Drewry Ship Repair Report 2011</td>
<td>113</td>
</tr>
<tr>
<td>10-12</td>
<td>Dry-dock Facilities in the Caribbean (MCTA 2006)</td>
<td>113</td>
</tr>
<tr>
<td>10-13</td>
<td>Direct Contribution to GDP of Caribbean Economies</td>
<td>118</td>
</tr>
<tr>
<td>10-14</td>
<td>Direct Contribution to Employment in Caribbean Economies</td>
<td>119</td>
</tr>
<tr>
<td>Figure 10-15 Capital Investment in Travel and Tourism</td>
<td>119</td>
<td></td>
</tr>
<tr>
<td>Figure 10-16 Direct contribution to GDP in Trinidad and Tobago</td>
<td>124</td>
<td></td>
</tr>
<tr>
<td>Figure 10-17 Direct contribution to Employment in Trinidad and Tobago</td>
<td>124</td>
<td></td>
</tr>
<tr>
<td>Figure 10-18 Capital Investment in Trinidad and Tobago</td>
<td>125</td>
<td></td>
</tr>
<tr>
<td>Figure 10-19 Direct contribution of Visitor Exports and International Tourist Arrivals</td>
<td>125</td>
<td></td>
</tr>
<tr>
<td>Figure 10-20. Examples of the range of available services (Number of establishments in brackets)</td>
<td>127</td>
<td></td>
</tr>
<tr>
<td>Figure 10-21 Employment Distribution in the Yachting Industry by Functional Area</td>
<td>128</td>
<td></td>
</tr>
<tr>
<td>Figure 10-22. Number of Yacht Arrivals in Trinidad and Tobago</td>
<td>130</td>
<td></td>
</tr>
<tr>
<td>Figure 10-23 Capacity of Boatyards and Marinas</td>
<td>131</td>
<td></td>
</tr>
<tr>
<td>Figure 10-24 Yacht Arrivals in Trinidad</td>
<td>131</td>
<td></td>
</tr>
<tr>
<td>Figure 10-25 Import duties collected (Jan- Sept 2012 versus 2013)</td>
<td>137</td>
<td></td>
</tr>
<tr>
<td>Figure 10-26. Motor Vehicle Tax collected (Jan-Sept 2012 versus 2011)</td>
<td>138</td>
<td></td>
</tr>
<tr>
<td>Figure 10-27. Frequency distribution for the time taken to release commercial cargo for delivery to consignees</td>
<td>139</td>
<td></td>
</tr>
<tr>
<td>Figure 10-28. Cash Transactions versus On-Line Deposit Account Transactions</td>
<td>140</td>
<td></td>
</tr>
<tr>
<td>Figure 10-29. Customs and Excise Division Overtime Collected</td>
<td>140</td>
<td></td>
</tr>
<tr>
<td>Figure 10-30. Main Leasehold Operators at the Port of Point Lisas</td>
<td>149</td>
<td></td>
</tr>
</tbody>
</table>
1. Introduction

In order to provide a cohesive strategy and leadership for the development of the maritime sector, The Ministry of Planning and Sustainable Development and its advisory entity, the Economic Development Board (EDB), have contracted Nathan Associates Inc. to provide this Port Rationalization Study. The study involves a detailed analysis of the T&T Port and Maritime Sector in each of the following markets:

- Domestic T&T containerized cargo flows;
- Secondary regional transshipment markets;
- Broader regional transshipment hub port role;
- Other maritime subsectors that can develop as part of the maritime cluster.

T&T's geographic location in the Caribbean and relatively near the Panama Canal requires that the analysis go beyond the direct trade related to T&T and instead include greater analysis of the regional maritime sector and trade and international trends in shipping affected by the expansion of the Panama Canal. This Report is the final deliverable of the study and presents a comprehensive assessment of the maritime and port industries in the Caribbean region and the role of T&T ports in the container trade.
2. Assessment of Historical T & T and Caribbean Container Volumes

2.1. Introduction

This chapter provides a general view of recent historic container port throughput statistics for the Caribbean region. It also al container port market. of interest Port-by-port statistics by TEUs, separating gateway and transshipment for all countries in the Caribbean Sea.

2.2. T&T and Caribbean Container Volumes

*Figures 2-1 to 2-4* present throughput data for all the ports in the Caribbean region (Caribbean Islands, Central America littoral states and North Coast of South America). As all the port regions in the world, the Caribbean has experienced a solid increase in port throughput since the 2008-2009 world economic crisis. Overall, the Compounded Annual Growth Rate (CAGR) for the period 2008-2012 is about 6%. However, if we analyze the Caribbean sub-regions, we can differentiate which ones had better performance. Figure 2-1 shows that the South American countries had an impressive growth followed by Central America while the Caribbean Islands showed stagnation. Figures 2-2 to 2-4 provide a disaggregated view of port traffic by country and port that allows the identification of the best performers. For the Caribbean Islands, Caucedo, Dominican Republic has shown an impressive growth in the last 5 years. In the Central America sub-region, of course the Panamanian terminals had steady growth but all the other countries have also shown healthy growth rates. In South America, the strong performance of the Colombian ports is significant.

*Figure 2-1 Port Throughput in the Caribbean Region, 2008-2012 (TEU)*

<table>
<thead>
<tr>
<th>Region</th>
<th>2008</th>
<th>2009</th>
<th>2010</th>
<th>2011</th>
<th>2012</th>
<th>CAGR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Central America (Caribbean Littoral)</td>
<td>4,645,577</td>
<td>4,268,640</td>
<td>5,111,351</td>
<td>5,828,475</td>
<td>6,151,308</td>
<td>7.3%</td>
</tr>
<tr>
<td>Caribbean Islands</td>
<td>5,611,325</td>
<td>5,095,560</td>
<td>5,563,382</td>
<td>5,786,576</td>
<td>5,594,080</td>
<td>-0.1%</td>
</tr>
<tr>
<td>South America (Caribbean Littoral)</td>
<td>2,469,382</td>
<td>2,575,889</td>
<td>2,938,219</td>
<td>3,491,355</td>
<td>4,104,521</td>
<td>13.5%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>12,726,284</td>
<td>11,940,089</td>
<td>13,612,952</td>
<td>15,106,406</td>
<td>15,849,909</td>
<td>5.6%</td>
</tr>
</tbody>
</table>
### Figure 2-2 Port Throughput in the Caribbean Islands, 2008-2012 (TEU)

<table>
<thead>
<tr>
<th>Country/Port</th>
<th>2008</th>
<th>2009</th>
<th>2010</th>
<th>2011</th>
<th>2012</th>
<th>CAGR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jamaica</td>
<td>1,915,951</td>
<td>1,728,042</td>
<td>1,891,770</td>
<td>1,756,832</td>
<td>1,139,418</td>
<td>-12.2%</td>
</tr>
<tr>
<td>Kingston</td>
<td>1,915,951</td>
<td>1,728,042</td>
<td>1,891,770</td>
<td>1,756,832</td>
<td>1,139,418</td>
<td></td>
</tr>
<tr>
<td>Dominican Republic</td>
<td>1,109,771</td>
<td>1,241,078</td>
<td>1,359,119</td>
<td>1,591,735</td>
<td>1,879,005</td>
<td>14.1%</td>
</tr>
<tr>
<td>Caoeado</td>
<td>736,879</td>
<td>906,279</td>
<td>1,004,901</td>
<td>993,561</td>
<td>1,153,787</td>
<td></td>
</tr>
<tr>
<td>Haina</td>
<td>283,229</td>
<td>277,971</td>
<td>288,417</td>
<td>352,340</td>
<td>379,632</td>
<td></td>
</tr>
<tr>
<td>Puerto Plata</td>
<td>43,622</td>
<td>33,029</td>
<td>44,147</td>
<td>211,452</td>
<td>228,311</td>
<td></td>
</tr>
<tr>
<td>Santo Domingo (ITTS)</td>
<td>46,041</td>
<td>23,799</td>
<td>21,654</td>
<td>34,382</td>
<td>117,355</td>
<td></td>
</tr>
<tr>
<td>Bahamas</td>
<td>1,702,000</td>
<td>1,297,000</td>
<td>1,125,000</td>
<td>1,116,272</td>
<td>1,202,000</td>
<td>-8.3%</td>
</tr>
<tr>
<td>Freeport</td>
<td>1,702,000</td>
<td>1,297,000</td>
<td>1,125,000</td>
<td>1,116,272</td>
<td>1,202,000</td>
<td></td>
</tr>
<tr>
<td>Trinidad and Tobago</td>
<td>500,833</td>
<td>500,776</td>
<td>580,521</td>
<td>555,738</td>
<td>547,195</td>
<td>2.2%</td>
</tr>
<tr>
<td>Port of Spain</td>
<td>385,000</td>
<td>401,206</td>
<td>388,960</td>
<td>379,837</td>
<td>365,895</td>
<td></td>
</tr>
<tr>
<td>Point Lisas</td>
<td>115,833</td>
<td>99,570</td>
<td>191,561</td>
<td>175,901</td>
<td>181,300</td>
<td></td>
</tr>
<tr>
<td>Guadeloupe</td>
<td>170,729</td>
<td>142,692</td>
<td>150,534</td>
<td>165,093</td>
<td>211,871</td>
<td>5.5%</td>
</tr>
<tr>
<td>Pointe-Pitre/Jarry</td>
<td>170,729</td>
<td>142,692</td>
<td>150,534</td>
<td>165,093</td>
<td>211,871</td>
<td></td>
</tr>
<tr>
<td>Cuba</td>
<td>228,346</td>
<td>246,773</td>
<td>240,000</td>
<td>240,000</td>
<td>240,000</td>
<td>2.5%</td>
</tr>
<tr>
<td>La Habana</td>
<td>228,346</td>
<td>246,773</td>
<td>240,000</td>
<td>240,000</td>
<td>240,000</td>
<td></td>
</tr>
<tr>
<td>Barbados</td>
<td>87,255</td>
<td>82,832</td>
<td>80,430</td>
<td>77,051</td>
<td>72,163</td>
<td>-4.6%</td>
</tr>
<tr>
<td>Bridgetown</td>
<td>87,255</td>
<td>82,832</td>
<td>80,430</td>
<td>77,051</td>
<td>72,163</td>
<td></td>
</tr>
<tr>
<td>Aruba</td>
<td>49,558</td>
<td>169,719</td>
<td>167,948</td>
<td>167,948</td>
<td>167,948</td>
<td>84.1%</td>
</tr>
<tr>
<td>Oranjestad</td>
<td>49,558</td>
<td>169,719</td>
<td>167,948</td>
<td>167,948</td>
<td>167,948</td>
<td></td>
</tr>
<tr>
<td>Saint Lucia</td>
<td>70,202</td>
<td>51,942</td>
<td>52,455</td>
<td>62,597</td>
<td>89,080</td>
<td>6.1%</td>
</tr>
<tr>
<td>Castries</td>
<td>35,977</td>
<td>30,186</td>
<td>30,625</td>
<td>29,550</td>
<td>37,672</td>
<td></td>
</tr>
<tr>
<td>Vieux Fort</td>
<td>34,225</td>
<td>21,756</td>
<td>21,830</td>
<td>33,047</td>
<td>51,408</td>
<td></td>
</tr>
<tr>
<td>Cayman Islands</td>
<td>54,584</td>
<td>51,198</td>
<td>45,649</td>
<td>44,766</td>
<td>45,400</td>
<td>-4.5%</td>
</tr>
<tr>
<td>Georgetown-Cayman</td>
<td>54,584</td>
<td>51,198</td>
<td>45,649</td>
<td>44,766</td>
<td>45,400</td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>5,611,325</td>
<td>5,095,560</td>
<td>5,563,382</td>
<td>5,786,576</td>
<td>5,594,080</td>
<td>-0.1%</td>
</tr>
</tbody>
</table>

### Figure 2-3 Port Throughput in Central America (Caribbean littoral), 2008-2012 (TEU)

<table>
<thead>
<tr>
<th>Country/Port</th>
<th>2008</th>
<th>2009</th>
<th>2010</th>
<th>2011</th>
<th>2012</th>
<th>CAGR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Panama</td>
<td>2,468,520</td>
<td>2,210,720</td>
<td>2,810,657</td>
<td>3,371,714</td>
<td>3,518,672</td>
<td>9.3%</td>
</tr>
<tr>
<td>Colón (MIT, Evergreen, Panamá Port)</td>
<td>2,468,520</td>
<td>2,210,720</td>
<td>2,810,657</td>
<td>3,371,714</td>
<td>3,518,672</td>
<td></td>
</tr>
<tr>
<td>Costa Rica</td>
<td>835,143</td>
<td>748,029</td>
<td>858,176</td>
<td>901,330</td>
<td>1,045,215</td>
<td>5.8%</td>
</tr>
<tr>
<td>Limón-Moin</td>
<td>835,143</td>
<td>748,029</td>
<td>858,176</td>
<td>901,330</td>
<td>1,045,215</td>
<td></td>
</tr>
<tr>
<td>Guatemala</td>
<td>571,316</td>
<td>647,592</td>
<td>757,835</td>
<td>812,712</td>
<td>833,976</td>
<td>9.9%</td>
</tr>
<tr>
<td>Santo Tomas de Castilla</td>
<td>322,519</td>
<td>329,946</td>
<td>431,002</td>
<td>494,908</td>
<td>468,734</td>
<td></td>
</tr>
<tr>
<td>Puerto Barrios</td>
<td>248,797</td>
<td>317,646</td>
<td>326,833</td>
<td>317,804</td>
<td>365,242</td>
<td></td>
</tr>
<tr>
<td>Honduras</td>
<td>669,802</td>
<td>571,920</td>
<td>619,867</td>
<td>662,644</td>
<td>663,908</td>
<td>-0.2%</td>
</tr>
<tr>
<td>Puerto Cortes</td>
<td>572,382</td>
<td>484,148</td>
<td>538,853</td>
<td>576,752</td>
<td>573,322</td>
<td></td>
</tr>
<tr>
<td>Puerto Castilla</td>
<td>97,420</td>
<td>87,772</td>
<td>81,014</td>
<td>85,892</td>
<td>90,586</td>
<td></td>
</tr>
<tr>
<td>Nicaragua</td>
<td>62,585</td>
<td>59,035</td>
<td>64,816</td>
<td>80,075</td>
<td>89,537</td>
<td>9.4%</td>
</tr>
<tr>
<td>Corinto</td>
<td>58,879</td>
<td>55,742</td>
<td>64,816</td>
<td>80,075</td>
<td>89,537</td>
<td></td>
</tr>
<tr>
<td>Arlen Siu/El Rama</td>
<td>3,706</td>
<td>3,293</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bélice</td>
<td>38,211</td>
<td>31,344</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>4,645,577</td>
<td>4,268,640</td>
<td>5,111,351</td>
<td>5,828,475</td>
<td>6,151,308</td>
<td>7.3%</td>
</tr>
</tbody>
</table>
Assessment of Historical T & T and Caribbean Container Volumes

Figure 2-4 Port Throughput in South America (Caribbean littoral), 2008-2012 (TEU)

The Caribbean region is host to the main container hubs in the hemisphere where intense transshipment activity occurs to serve all trades in the Americas and the Caribbean. The following chapters of the report present a comprehensive review of how shipping lines deploy their services in the region and how the ports compete for this trade. A list of the main hubs in the region is presented in Figure 2-5 and shows the high levels of growth or decline in their throughput that reflects the volatility of this trade.

Figure 2-5 Port Throughput at the Caribbean Main Hubs, 2008-2012 (TEU)

<table>
<thead>
<tr>
<th>Country/Port</th>
<th>2008</th>
<th>2009</th>
<th>2010</th>
<th>2011</th>
<th>2012</th>
<th>CAGR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Colombia</td>
<td>1,223,017</td>
<td>1,407,571</td>
<td>1,776,431</td>
<td>2,088,755</td>
<td>2,503,372</td>
<td>19.6%</td>
</tr>
<tr>
<td>Cartagena (inc. S.P.R, El Bosque, Cont)</td>
<td>1,064,105</td>
<td>1,237,873</td>
<td>1,581,401</td>
<td>1,853,342</td>
<td>2,205,948</td>
<td>20.0%</td>
</tr>
<tr>
<td>Barranquilla (Inc.PR y ZP)</td>
<td>81,799</td>
<td>83,926</td>
<td>103,869</td>
<td>148,093</td>
<td>179,652</td>
<td>15.5%</td>
</tr>
<tr>
<td>Santa Marta (Inc. SPR y ZP)</td>
<td>77,113</td>
<td>85,772</td>
<td>91,161</td>
<td>87,320</td>
<td>117,772</td>
<td>15.5%</td>
</tr>
<tr>
<td>Venezuela</td>
<td>1,246,365</td>
<td>1,168,318</td>
<td>1,042,355</td>
<td>1,305,600</td>
<td>1,535,149</td>
<td>5.3%</td>
</tr>
<tr>
<td>Puerto Cabello</td>
<td>809,454</td>
<td>790,000</td>
<td>629,895</td>
<td>721,500</td>
<td>845,917</td>
<td>15.5%</td>
</tr>
<tr>
<td>La Guaira</td>
<td>436,911</td>
<td>378,318</td>
<td>328,447</td>
<td>467,300</td>
<td>542,710</td>
<td>15.5%</td>
</tr>
<tr>
<td>Maracaibo</td>
<td>41,974</td>
<td>58,300</td>
<td>75,728</td>
<td>70,794</td>
<td>70,794</td>
<td>15.5%</td>
</tr>
<tr>
<td>Guanta</td>
<td>42,039</td>
<td>58,500</td>
<td>70,794</td>
<td>70,794</td>
<td>70,794</td>
<td>15.5%</td>
</tr>
<tr>
<td>Suriname</td>
<td>59,583</td>
<td>97,000</td>
<td>59,583</td>
<td>97,000</td>
<td>59,583</td>
<td>-5.0%</td>
</tr>
<tr>
<td>Nieuwe Haven (Paramaribo)</td>
<td>59,583</td>
<td>97,000</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Guyana</td>
<td>59,850</td>
<td>66,000</td>
<td>59,850</td>
<td>66,000</td>
<td>59,850</td>
<td>-5.0%</td>
</tr>
<tr>
<td>Georgetown</td>
<td>59,850</td>
<td>66,000</td>
<td>59,850</td>
<td>66,000</td>
<td>59,850</td>
<td>-5.0%</td>
</tr>
<tr>
<td>Total</td>
<td>2,469,382</td>
<td>2,575,889</td>
<td>2,938,219</td>
<td>3,491,355</td>
<td>4,104,521</td>
<td>13.5%</td>
</tr>
</tbody>
</table>

2.3. T&T Container Trade and Ports Market Share

Domestic trade (imports and exports) is the main component of T&T port throughput but it is far from dominant due to the volumes of transshipment cargo in the Port of Port of Spain (POS). Figure 2-6 presents a detailed compilation of the domestic and transshipment trades at the country’s two container ports.

A significant difference between the Port of POS and Point Lisas in terms of served trades is the relative balance between domestic and transshipment trade in Port of POS (although lately transshipment trade is trending to reach 60% of port throughput) and the dominance of domestic trade at Point Lisas. This is the result of the “specialization” of each terminal with Point Lisas serving mainly shipping lines connecting with the US (mainly Florida), the source of most imports, and Port of POS serving larger carriers that use its facilities both for domestic trades but also for regional transshipment. A comprehensive analysis of the shipping lines
deployment and Port of POS and Point Lisas facilities is presented later in this report (Chapters 3 and 4).

Most of the domestic trade handled at T&T ports is import cargo as shown in Figure 2-7 (about 84% of full TEUs for the last two years in Port of POS). Therefore, port throughput related to domestic cargo is quite dependent on the country’s consumption trends and not on export volumes. The main domestic trade is imports mostly from the United States (food, electronics, department store items) and Asia (electronics, electro domestic items). Some of the US imports are “Asia sourced” and then re-stuffed in warehouses located in Florida. Other imports come from Latin America, increasingly from Brazil (food, furniture).

**Figure 2-6 Port of Port of Spain and Point Lisas Domestic and Transshipment Trades**

### Port of Port of Spain

<table>
<thead>
<tr>
<th>Year</th>
<th>Domestic (Imp/Exp)</th>
<th>Transshipment</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>TEU</td>
<td>Share</td>
<td>TEU</td>
</tr>
<tr>
<td>2010</td>
<td>172,285</td>
<td>44%</td>
<td>216,675</td>
</tr>
<tr>
<td>2011</td>
<td>161,634</td>
<td>43%</td>
<td>218,203</td>
</tr>
<tr>
<td>2012</td>
<td>175,376</td>
<td>48%</td>
<td>190,519</td>
</tr>
<tr>
<td>2013</td>
<td>160,196</td>
<td>42%</td>
<td>221,036</td>
</tr>
<tr>
<td>Avg 2010-2013</td>
<td>167,373</td>
<td>44%</td>
<td>211,608</td>
</tr>
</tbody>
</table>

### Point Lisas

<table>
<thead>
<tr>
<th>Year</th>
<th>Domestic (Imp/Exp)</th>
<th>Transshipment</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>TEU</td>
<td>Share</td>
<td>TEU</td>
</tr>
<tr>
<td>2010</td>
<td>151,780</td>
<td>79%</td>
<td>39,781</td>
</tr>
<tr>
<td>2011</td>
<td>146,958</td>
<td>84%</td>
<td>28,943</td>
</tr>
<tr>
<td>2012</td>
<td>155,053</td>
<td>86%</td>
<td>26,247</td>
</tr>
<tr>
<td>Avg 2010-2012</td>
<td>151,264</td>
<td>83%</td>
<td>31,657</td>
</tr>
</tbody>
</table>

### Port of POS + Point Lisas

<table>
<thead>
<tr>
<th>Year</th>
<th>Domestic (Imp/Exp)</th>
<th>Transshipment</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>TEU</td>
<td>Share</td>
<td>TEU</td>
</tr>
<tr>
<td>2010</td>
<td>324,065</td>
<td>56%</td>
<td>256,456</td>
</tr>
<tr>
<td>2011</td>
<td>308,592</td>
<td>56%</td>
<td>247,146</td>
</tr>
<tr>
<td>2012</td>
<td>330,429</td>
<td>60%</td>
<td>216,766</td>
</tr>
<tr>
<td>Avg 2010-2012</td>
<td>321,029</td>
<td>57%</td>
<td>240,123</td>
</tr>
</tbody>
</table>
2.4. Future Trends

Being that imports are the dominant trade, port throughput for domestic cargo is directly related to the import volumes (exports will use only a fraction of the containers unloaded with import cargo and the rest will be “exported” as empty containers). Therefore, a good correlation should exist between domestic cargo port throughput and consumption patterns. And since consumption patterns are reflected in the country’s GDP, a correlation should exist between domestic port throughput and GDP.

Many studies\(^1\) 2,3 recognize the relationship between GDP and trade volume and consider this relationship in the formulation of container trade demand forecasts. The forecasting

\[^1\] See, for example, UNESCAP and Korea Maritime Institute, Regional Shipping and Port Development, Container Traffic Forecast 2007 Update, Publication ST/ESCAP/2484, 2007, New York, p. 28. The report states that “although there is a wide range of factors that impact on the volume of container imports and exports, including exchange rate fluctuations, changes in economic structure, etc., it is necessary for forecasting purposes to use very simplified relationships, as many of the causal variables are themselves even harder to predict than container volumes. An example of this analytical challenge is that even though container imports and exports are undoubtedly greatly affected by exchange rate movements, the uncertainties involved in estimating exchange rates are immense.”

\[^2\] The linkages between trade and GDP growth are not surprising. Economists have long assessed the impact of liberalized trade regimes on trade growth and the relationships between trade growth and GDP. This is not to say that growth rates between GDP and trade volume are the same; container volumes are a reasonable reflection of the extent of trade a country engages in due to the fact that the vast majority of trade volumes are handled in maritime
relationships used by most industry studies are simple linear relationships between container volumes and GDP. And in most cases, regression analysis provides a good basis for measuring the extent to which these relationships are correlated (see the comparison of world container trade and GDP growth rates in Figure 2-8 and the U.S. example in Figure 2-9). We have in fact corroborated this notion in several studies (Figures 2-10 and 2-11 present typical examples of the correlations of GDP and container import trends, in these cases for Peru’s Puerto Callao and Colombia’s Puerto Buenaventura container throughput). As is shown below, the methodology we apply here uses this industry standard. After establishing the relationship between GDP and the container trade, container trade forecasts are calculated as a function of forecasts for GDP growth.

Figure 2-8 World Container Trade and GDP Growth Rates

![Graph showing container handling growth and GDP growth from 1991 to 2012]

Note that trade volumes decline more sharply than output during downturns while trade accelerates faster than GDP when the economy picks up. For example, in 2009 trade volumes dropped by nearly 11% whereas GDP fell by only 1%. But last year trade flows rose by 12.5%, far faster than the 4.9% increase in global output. This is attributable in part to the rise in global supply chains; the movement of goods across borders occurs much more often than in conditions where most stages of production were centered within a country.
Figure 2-9 Growth in U.S. Container Trade and Real GDP: 1995–2008

Regression Statistics

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Multiple R</td>
<td>0.977582</td>
<td></td>
</tr>
<tr>
<td>R Square</td>
<td>0.9556667</td>
<td></td>
</tr>
<tr>
<td>Adjusted R Square</td>
<td>0.9519722</td>
<td></td>
</tr>
<tr>
<td>Standard Error</td>
<td>6.9010247</td>
<td></td>
</tr>
<tr>
<td>Observations</td>
<td>14</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Standard Error</th>
<th>t Stat</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td>-149.07696</td>
<td>-9.0697447</td>
</tr>
<tr>
<td>U.S. real GDP</td>
<td>2.5825943</td>
<td>16.0834274</td>
</tr>
</tbody>
</table>

Figure 2-10 Historic Trends for Callao Imports TEU and Peru’s GDP
For T&T, there is also a clear relationship between domestic container trade and GDP, as shown in Figure 2-12. We will conduct a regression analysis to determine the correlation between T&T GDP and domestic container growth, the standard approach for generating trade forecasts, and apply the regression results to future GDP projections. The key assumption then to project domestic container growth will be the assumed GDP growth rates. Figure 2-13 present the values assumed for GDP growth; the data comes from the International Monetary Fund’s World Economic Outlook (updated in October 2013) for the years 2013-2018, Base Case. It is standard practice that long-term forecasts assume conservative scenarios. Most industry analyses apply historic growth rates from periods with similar macroeconomic conditions to determine expected future conditions. Results are only indicative and are intended simply to provide a reasonable range. GDP growth assumptions for the rest of the forecasting horizon (2019-2025) are based on historic GDP growth from 2000 to 2012 and the short-term (2013-2018) forecasted rates by the International Monetary Fund’s World Economic Outlook. Higher/lower scenarios are assumed by adding/subtracting fractions of a percent point.
### Figure 2-12 Historic Trends for T&T Domestic Container Trade and GDP

![Graph showing historic trends for T&T Domestic Container Trade and GDP](image)

### Figure 2-13 Historic Trends for T&T Domestic Container Trade and GDP

<table>
<thead>
<tr>
<th>Year</th>
<th>GDP Growth, Base</th>
<th>GDP Growth, High</th>
<th>GDP Growth, Low</th>
</tr>
</thead>
<tbody>
<tr>
<td>2013</td>
<td>1.6%</td>
<td>2.4%</td>
<td>1.4%</td>
</tr>
<tr>
<td>2014</td>
<td>2.3%</td>
<td>2.4%</td>
<td>1.4%</td>
</tr>
<tr>
<td>2015</td>
<td>2.4%</td>
<td>2.4%</td>
<td>1.4%</td>
</tr>
<tr>
<td>2016</td>
<td>2.0%</td>
<td>2.4%</td>
<td>1.4%</td>
</tr>
<tr>
<td>2017</td>
<td>1.7%</td>
<td>2.4%</td>
<td>1.4%</td>
</tr>
<tr>
<td>2018</td>
<td>1.7%</td>
<td>2.4%</td>
<td>1.4%</td>
</tr>
<tr>
<td>2019-2025</td>
<td>3.6%</td>
<td>4.1%</td>
<td>3.1%</td>
</tr>
</tbody>
</table>
3. T&T and Caribbean Main Shipping Services

3.1. Worldwide Service Patterns

Asia / Americas Service Patterns

The shipping services of the T&T are part of those serving the Caribbean Region. The Caribbean shipping services, in turn, are part of a wider network of shipping services that connect the main world’s regions. Hence, we begin our analysis with a brief review of the part of the world’s services relevant to the Caribbean Region. These services connect Asia with the East Coast of North America (ECNA) and the East Coast of South America (ECSA). Figure 3-1 shows the main service patterns of the Asia/ECNA and Asia/ECSA services.

Figure 3-1 Main Patterns of the Asia/ECNA and Asia/ECSA Services

The Asia/ECNA trade is much larger than the Asia/ECSA one. As illustrated in Figure 3-1, the Asia/ECNA trade is handled by 3 primary service patterns:

- **Transpacific + Rail “Bridge”** – marked in a dark blue line, the largest among the three patterns, with its main services provided by post-Panamax ships of 12,000 TEUs;
- **All-Water Panama (AWP)** – marked in a brown line, with its main services provided by Panamax ships of up to 5,000 TEUs; and
- **All-Water Suez (AWS)** – Marked in light blue line, with its services provided by post-Panamax ships of up to 9,000 TEUs.

The service patterns above are presented according to their route length and respective transit time. The first pattern, Transpacific/Bridge, has the shortest transit time and the highest cost due to the relatively high cost rail leg and therefore is mainly used for high-value
cargoes. This pattern is the least relevant to the Caribbean Region and therefore will not be discussed here. The second pattern, the AWP, is the only one which passes through the Caribbean Region and therefore the most relevant for our study. AWP also is the most important service that transits the Canal. In 2012, The Panama Canal Authority reports listed 14 AWP services accounting for 6.5 million TEUs or 56% of the total 11.6 million TEUs that transit the Canal. The second largest Cross-Canal service pattern is West Coast South America (WCSA)/Europe (see later in Figure 3-10), with 7 services and 2.4 million TEUs.

**Figure 3-2** shows a route (also referred to as service map or rotation) of a typical AWP service. The figure includes the rotation of the AWE1 of Coscon, provided by 9 x 4,250-TEU Panamax ships. Coscon is a Chinese line and the key member of the CKYH alliance (the letter C stands for Coscon). This alliance is presently the largest provider of AWP services worldwide, with a total of 5 separate services, 4 to the US East Coast (ECNA) and one dedicated to the US Gulf Coast (Houston). As seen in this figure, the AWE1 service, as well as all the AWP services provided by this alliance, only stops in Panama, in Colon, at Manzanillo International Terminal (MIT), but not in any other port in the Caribbean Region. It seems, therefore, that the CKYH Alliance’s AWP services are not heavily involved in the Caribbean market. A review of the AWP services of the other alliances yields that their services also follow the same pattern of sailing directly from Panama to the US, crossing through the Caribbean Region but not stopping at any port underway.4

Still, the AWP services play an important role in serving the Asian / Caribbean trade using either the Panamanian Atlantic ports or, to a lesser extent, Florida ports as hubs. **Figure 3.3** shows the service map of MOL’s CNY service, an All-Water Panama service, along with 2 related feeder services to the Caribbean Region. This figure suggests that MOL, a member of the G6 alliance is extensively involved in the Asia / Caribbean trade, using MIT as its hub and reaching with its feeding network all the way to the northern Caribbean Island Puerto Rico. It should also be noted in this figure that MOL has a special feeder service from MIT to Venezuela, calling both at Puerto Cabello and La Guairá. Venezuela, as will be discussed later, is within the potential “feeding range” of T&T.

We also use MOL to illustrate the third service pattern, the AWS. **Figure 3.4** shows the service map of the CEC service of MOL. The AWS service, as seen in this figure, has no direct involvement with the Caribbean Region. However, the AWS competes with the AWP service on handling the Asia/ECNA trade and AWP also is the main cross-Caribbean services. As will be seen below, the AWS seems to have the upper hand in this competition.

---

4 One exception is the NYE (MOL name) of the G6 alliance, which includes a stop in Kingston in its AWP service.
Figure 3-2 Coscon Asia/ECNA (AWP) Service

Figure 3-3 MOL Asia/ECNA (AWP) Service and related Feeders
Shipping Line Alliances

We already mentioned above the G6 and CKYH alliances of shipping lines. Hence, a brief note about the “alliancing” phenomenon which has been reshaping the liner shipping industry is warranted at this point. Operational cooperation among shipping lines through joint services, whereby each line provides some of the ships participating in the service, has characterized liner shipping for many years. The novelty in the recent alliancing is the much larger scale of cooperation. In the case of the new “super” alliances the cooperation encompasses the largest maritime trades worldwide, between Asia, Europe and North America, commonly referred to as the major east/west trade lanes. The Asia/ECNA services discussed above also serve the Asia/North America and are therefore included in the super alliances.

The shipping lines operating on the major east/west are organized in three “super alliances”, two of which are already in operation: (a) CKYH, consisting of Coscon, K-Line Yangming and Hanjin; recent news indicate that Evergreen will soon join in; (b) G6, consisting of APL, Hapag-Lloyd, MOL, NYK, OOCL and HMM. The third and the largest one, named P3, consisting of Maersk, MSC and CMA-CGM, is planning to begin operation in 2014, pending to approval by regulatory agencies in the US, Europe and China. The P3 will encompass 255 ships with a total capacity 2.6 million TEU deployed on 29 services connecting Asia, Europe and North America.

The three super alliances above only encompass the major east/west trade lanes, but exclude secondary east/west and north/south services in which lines from different super alliances have joint services. A salient example is the main service of POS, PEX2, in which CSAV, soon to become a G6 member following its merger with Hapag Lloyd, is partnering with CMA-CGM and MSC, P3 members. CSCL, the third partner in PEX2 is still not affiliated with any alliance. It is reasonable to assume that in the long-term, the super alliances will be expanded to other services. In fact, CMA-CGM and MSC already agreed to join forces on all South America services.
All-Water Panama vs. All-Water Suez

The All-Water Panama (AWP) is shorter than All-Water Suez (AWS) for Asian countries located north of Singapore, usually defined as the Far East (China, Hong Kong, South Korea and Japan). The Far East countries account for most of the east/west trade. Due to its shorter route, in the past the AWP handled for most All-Water Asia / ECNA trade. However, the AWP is constrained in its ship size by the existing locks of Panama Canal to 5,000 TEUs. The Suez Canal has no locks and already handles ships of 18,000 TEUs. Taking advantage of it, in recent years lines began deploying ships of 9,000 TEUs on the AWS, reducing its cost to below that of the AWP. This cost differential triggered, in turn, lines to redeploy their AWP onto AWS service pattern. As a result, presently the AWS and the AWP have roughly similar market shares.

The original rise of the longer-routed AWS was solely the result of the option to deploy larger-size ships. However, deploying larger-size also generated an option for “double-dipping” unavailable on AWP. Double-dipping refers to the possibility to sell the same ship-slot twice and increase revenues. For example, the AWS can include underway calls in the Middle East and the Mediterranean and combine an Asia / Middle East and Asia / Mediterranean services together with Middle East / ECNA and Mediterranean / ECNA services. The CEC service shown in Figure 3-4 includes such a call in Jeddah, the main port of Saudi Arabia. The double-dipping options available for the AWS are much vaster than those available to the AWP; the Caribbean Region is much smaller than the Mediterranean. Moreover, as will be seen later, the Caribbean Region trade with the US is covered by Caribbean Specialists.

The shift from AWP to AWS is notable especially when reviewing the newly announced P3 alliance, consisting of the Maersk, MSC and CMA-CGM. The P3 alliance, consisting of the first, second and third largest shipping lines worldwide, includes 3 AWS services provided by ships of 8,000 – 10,000 TEUs, but only one AWP service, provided by 10 x 5,000-TEU ships. Figure 3-5 shows the rotation of this future service as published by Maersk. Interestingly, this service, called TP15 by Maersk, only calls at 3 US southern ports: Houston, TX; Mobile, AL; and Miami, FL, but not at the much larger ports of the South and North Atlantic. As is the case with most AWP, the only call in the Caribbean Region is at MIT, Panama. Despite the call at MIT, the note attached to the new service does not mention Caribbean destinations. It seems that the service will devote most its capacity to its US ports with only a small portion allocated to the Caribbean. The P3 schedule reviewed for this study only relates to the pre-Panama-expansion period. Nevertheless, it is a precursor to the post-expansion era as discussed below.

---

5 Jeddah is expecting to become a new hub port, with a total investment of $6 billion and total capacity of 10 million TEU by 2019 as part of the King Abdullah Economic City.
Impact of Panama Canal Expansion on Service Pattern

The goal of the Panama Canal Expansion was twofold: providing additional transiting capacity and allowing the transit of larger ships. The expansion includes construction of a third set of locks along with new access channels and raising the water level of Gatun Lake. Figure 3-6 shows the dimensions of the new locks and related New Panamax (NPX) ship of about 13,000 TEUs with dimensions of 366 x 49 x 15.2 m (LOA x Beam x Draft). The addition of the third set of locks will double the capacity of the Canal because the 13,000-TEU NPX are more than twice in size than the 5,000-TEU Panamax.
The question of the impact of the 2015 expansion has been the subject of extensive discussions in professional literature and public conferences involving, among others, team members of this study. There are two opposing views on the subjects. One view, supported especially by the Canal Authority and many ports, is that the expansion will be a “game changer”, meaning substantial increase in trade and related activities in Panama, US and the Caribbean Region. The counter view, shared by most independent experts and shipping lines, argues that the Canal expansion by itself cannot generate a new trade activity. The expansion will simply reduce the cost of Cross-Canal attracting traffic to these services at the expense of the non-Canal services serving the same trade flows. Accordingly, the main impact of the expansion would simply be a shift back of services and trade from the AWS to the AWP. There are also some expectations for a smaller diversion of trade from the Transpacific / Bridge service to AWP. We subscribe to the second view; we expect that the shift back of Asian trade to the Canal-crossing routes will be modest. As note earlier, the AWS has a major inherent advantage over AWP due to “double dipping” option. Other, longer-term trends in favor of the AWS are: (a) possibility for deploying ships much larger than NPX, such as the 18,000-TEU already deployed on the Asia/ Europe Suez route, or even larger; and (b) a shift in Asia’s trading regions from the Far East to Southeast and South Asia. We also expect that the diversion of traffic from the Transpacific / Bridge to AWP will be small in light of the recent development of the new bridge services based on Canadian and Mexican WCNA ports.

The issue of the impact of the Canal expansion is pivotal and therefore warrants reiterating. We have conducted interviews with port authority, terminal operators, shipping lines along with an extensive review of professional literature before we reached the conclusion that the impact is likely to be modest. We are well aware that our cautious assessment is not shared by the Panama Canal Authority basing its expectation on studies conducted by reputable consultants. It seems, however, that most of these studies6 are dated and therefore do not take account of the recent, massive conversion of AWP to AWS services. In any event, as will be discussed below, due to T&T location far away from the Canal any impact of the expansion is expected to be limited.

Transformation in AWP’s Ship Size and Service Pattern

The discussion above revolved on the impact of Panama Canal expansion on the relative market shares of the three service patterns of the Asia / American trades, especially on that of the AWP, the only pattern directly involved in the Caribbean Region. Another, equally important impact of the expansion will be on ship size. It seems that on this topic there is a general agreement that based on the experience with AWS, the change in the ship size of AWP service will take place in two stages:

- First Post-Expansion Period – Extending about 5 years or 2015 – 2020, deployment of 8,000-9,000 TEU ships, similar to those presently deployed on the All-Water Suez; and

---

Second Post-Expansion Period – Beyond 2020, deployment of 13,000-TEU ships, the largest that can transit through the expanded Canal defined as NPX.

The deployment of 13,000-TEU on AWP in the second period may provide substantial transshipment opportunities for Caribbean hub ports since the major US East and Gulf Coast ports are designed to handle the 8,000-TEU ships – but not the 13,000-TEU ones. Figure 3-7 illustrates the possible changes in the service pattern of the AWP following the Canal expansion. The figure presents four generic service patterns, a Conventional in which a single service covers the entire Atlantic Coast; a Direct in which there regional specialization; a Transshipment in which the service terminates at a Caribbean hub; and Circum-Equatorial (Equatorial Round-the-World) a futuristic concept involving worldwide consolidation of service patterns. The change from Direct to Transshipment is likely to take place in the second post-expansion period. The likely location of these hubs will be in Caribbean Region because the high cost of US ports and the need to employ high-cost US-flag ships. One possibility, based on the current rotation of AWP, would be to feeder ECS from the Panama’s Atlantic hubs. However, as shown in Figure 3-7, Panama is located too far from the US for this purpose. The natural location of such a hub will be in the Northern Caribbean Region, shortening the sailing distance of feeders by 750 NM. The relocation of the hub from Panama to the Northern Caribbean location could save about $23 million annually to a weekly AWP service based on NPX.7 Figure 3-7 also includes a depiction of the “Transshipment Triangle” suggesting that of Caribbean hubs offer the same transshipment services. The calculation above indicates the problems in this concept; while there is some overlapping in the feeder range of the various Caribbean hubs there is also specialization among them.

Figure 3-7 AWP Patterns following Panama Canal Expansion

---

Potential for AWP Calling T & T

**Figure 3-8** shows the generic route of an AWP service in full line and, in a broken line, the route of the same service with a deviation intended to include a way-port call in T&T. As clearly demonstrated in this figure, inclusion of a T&T call in AWP involves a huge deviation of about 1,500 NM. Hence, it is unlikely that following the Canal expansion a future AWP will incorporate a call at T&T – even if post-Panamax facilities are available there.

Moreover, as discussed above, T&T is located too far to the south to serve as a transshipment hub for North American ports. We therefore believe that the possibility of attracting an AWP to T&T can be ruled out from further analysis. Accordingly, the changes in AWP following the Canal expansion also have little bearing on T&T future.

**Asia / East Coast South America Service Pattern**

The discussion so far was dedicated to the Asia / ECNA service patterns and their role in serving the Caribbean Region. Figure 3-1, which shows the main Asia / Americas service patterns, includes another service pattern, Asia / ECSA through Cape of Good Hope in South Africa. **Figure 3-9** shows the rotation of such service, Maersk’s X4C – ASAS1, the largest services in the Asia/ECSA trade. It is a joint service of Maersk with CMA-CGM, employing 11 x 8,000-TEU post-Panamax ships. The largest ship deployed on this route, is Hamburg-Sud’s Cap San Augustin, a 9,600-TEU ship (332 x 48.2 x 14 m, 124,500 dwt) with 2,100 reefer plugs, the largest reefer capacity onboard ship worldwide.

The route through the Cape, depicted in Figure 3-1 in orange line, is presently the dominant service pattern of this trade. The alternative route, through Panama Canal, depicted in broken orange line, is equal in length. However, the Panamanian route is currently more costly due to the limited size of ships (Panamax) and transit tolls.
The expansion of the Canal will allow the deployment of larger ships on the Asia/ECSA, Cross-Panama route. However, the Cross-Panama route will still involve heavy tolls and more limited opportunities for “double-dipping” relative to Southern Africa. Hence, we expect that the impact of the Canal expansion on this service pattern will be limited and the majority of the trade will continue to prefer the Cape route.

**Figure 3-9 Maersk Asia/ECSA Service**

**The Impact of Panama Canal Expansion on Caribbean and T&T Transshipment**

Predicting future trends in liner shipping is notoriously difficult. Nevertheless, based on the above discussion, our summary observations are:

- The overall impact of the Panama Canal expansion on the Asia/ECNA trade is expected to be small and mainly related to the pattern of the services handling this trade. Following the expansion, the AWP, the only service that sails through the Caribbean, is likely to deploy Post II ships and may recapture some of the market share it lost to AWS.

- The impact of the Canal expansion on the Asia/Caribbean trade is expected to be even smaller than that on Asia/ECNA since AWP services usually sail through the Caribbean only stopping at Panama.

- Panama Canal expansion will not generate more trade in the Caribbean Region. Accordingly, the demand for intra-Caribbean transshipment traffic is not expected to grow following the expansion.
The demand for ECNA transshipment may substantially grow in the long future. However, this demand will be limited to Caribbean ports located close to ECNA, or in the Northern Caribbean.

It is highly unlikely that AWP services will deviate from their route through the Windward Passage to stop at T&T even if a modern hub is available there.

It is unlikely that Asia / ECSA will be diverted from its current route through Cape of Good Hope to a Panama route and possible call at T&T.

Altogether, we expect that the impact of the Canal expansion on Cross-Panama trade, the service pattern and market position of the Cross-Panama services to be small. More importantly, we expect that expansion impact on T&T will have will be even smaller.

### 3.1. Americas and Caribbean Services Patterns

#### Through-Caribbean vs. Caribbean Specialist Services

The Caribbean Region trades with the World’s major regions can be served by 2 primary service patterns:

- **Through-Caribbean** – Services that connects off-Caribbean Regions, but their route crosses the Caribbean Region and therefore can also serve the Caribbean trades via way-port calls; and
- **Caribbean Specialist** – Services between the Caribbean and off-Caribbean regions.

The difference between the two will be clarified by an example. The Asia/Caribbean trade can be handled by: (a) the AWP via Panama/Atlantic ports or Florida ports (the only stops of most AWP services); or (b) a specialist service between Asia and the Caribbean that may stop at several ports in the region. The relationship between these two alternative service patterns is one of the most critical issues in our study.

#### Through-Caribbean Services

*Figure 3-10* shows the main service patterns of the Through-Caribbean services. The Through-Caribbean services can be categorized according to their overall orientation and their involvement with Panama Canal into:

- Cross-Canal Services (“Diagonal”)
- Asia / ECNA
- Asia / GCNA
- WCSA / Europe
- WCSA / ECNA

---

8 For simplicity, Europe also includes here the Mediterranean.
Non-Canal Services ("Vertical")

ECSA / ECNA

ECSA / GCNA

The first two Cross-Canal services have already defined as All Water Panama (AWP). Some of the Asia/ECNA services, often referred to as "pendulum", extend their route with an ECNA/Europe or Transatlantic leg (see broken line). Altogether, the Through-Caribbean services include 6 separate service patterns, 4 diagonal and 2 vertical. The largest Through-Caribbean service pattern is the Asia/ECNA (AWP). Accordingly it is depicted in the thickest line.

The route of the diagonal Through-Canal services involves transiting Panama Canal; these services therefore are presently limited to employing Panamax ships with maximum capacity of 5,000 TEUs. However, once the Canal is expanded ship size is expected to grow to the 8,000-TEU range and later on to full NPX of 13,000 TEUs, especially on the high-volume trade lanes such as Asia/ECNA. The vertical services are not restricted by Panama Canal and therefore will not be directly impacted by its expansion. In fact, some of the vertical services already deploy ships reaching 7,000 TEUs. Pending on trade volumes, these services may employ even larger ships in the future, reaching the NPX. Currently, however, no Through-Caribbean service is calling T&T.

Figure 3-10 Service Patterns of Through Caribbean Services

---

9 Two other service patterns, WCNA/Europe and Oceania/NAEC, are excluded from Figure 8 because of their small volume.

10 The exception is MSC ECSA/GCNA service. However, this is a relatively small service operated by 2,500-TEU ships.
Another observation related to the longer future relates to a far-reaching transformation of the global service pattern. As seen in Figure 3-10, there is a considerable overlapping in the routes of the various patterns. For example, the Asia/ECNA, WCSA/ECNA and ECSA/ECNA have similar rotation along ECNA. The Circum-Equatorial Scenario in Figure 3-7 (lower right corner) assumes consolidation of all these patterns using a Caribbean hub.

**Caribbean Specialist Services**

Figure 3-11 shows the main service patterns of the Caribbean Specialist services. The Caribbean Region is depicted in this figure by a gray circle inside a circle of a broken black line and the services by black arrows pointing inward. The direction of these arrows indicates that the dominant direction of the Caribbean trade is imports (inbound).

**Figure 3-11 Service Patterns of Caribbean Specialist Services**

As seen in Figure 3-11, the main service patterns of the Caribbean Specialists include:

- Through-Canal Services
- Asia / Caribbean
- WCSA / Caribbean
- Non-Canal Services
- Florida / Caribbean
- ECNA / Caribbean
T&T and Caribbean Main Shipping Services

- ECSA / Caribbean
- Europe / Caribbean
- Intra-Caribbean Feeders

The differentiation between the ECNA/Caribbean (violet line) and Florida/Caribbean (short, thick black line) reflects the special role that Florida fulfills relative to the Caribbean trades. Florida is the main trading partner of the Caribbean. The ports of Jacksonville, Port Everglades and Miami, are the traditional hubs of this trade and the base of several specialist lines. The Florida-based services handle 3 types of trades: (a) US cargo destined to the Caribbean; (b) Transshipment of non-US cargo; and (c) a mixture of the two consolidated in the same box, often referred to as Less-Than-Container Load (LTL).

There is an overlapping between the service of the Caribbean Specialists and the Through-Caribbean services, with some lines provide both types. The history of the Caribbean Specialists can be tracked down to the time when Caribbean ports had inadequate port facilities. Accordingly, ships deployed on past service, where relatively small, geared ships. However, this era is a bygone now; the Caribbean Specialists are mostly employing modern, gearless containerships of 5,000 TEUs. There is one exception, however, the Florida/Caribbean Specialists, some are still deploying geared ships with capacity of about 1,000 TEUs. The Intra-Caribbean Feeders also employ ships of about 1,000 TEUs.

Feeder Service

The feeder service in the Caribbean is performed by 3 types of feeder services:

- Dedicated Feeders – Owned and operated by mainlines including CMA-CGM, Maersk, MSC and HSD;
- Short-Sea – Mainly the US specialists such as Seafreight, King and Seaboard Marine and to a lesser extend Tropical Shipping and Frontier Lines, which complement their own mainline trades with feeding of global mainliners
- Common Feeders – Only handling the traffic of mainline, including CFS and X-Press Feeders. Sometimes, common feeders partner with mainlines’ dedicated feeders to provide joint common feeder services.

It is estimated that worldwide, common feeders account for about 2/3 of the transshipped volume with most of the rest handled by dedicated feeders. Combined short-sea / feeder services are rare; short sea services’ main revenues are from the direct trade with feeder services serve as filler for empty slots.

3.2. Main Shipping Lines and Services

Global Lines, Florida/Caribbean Specialists and Caribbean Feeders

The main shipping lines serving the Caribbean can be divided into three categories:
CMA-CGM

CMA-CGM, based in Marseille, France, is the third largest shipping line worldwide (Maersk Line is the first and MSC is the second). However, CMA-CGM is the dominant line in the Caribbean with a comprehensive network of mainline and feeder services. CMA-CGM main hubs in the Caribbean Region are Kingston, Jamaica and Cartagena, Colombia; MIT, Panama and POS serve as secondary hubs. In August 2011 CMA-CGM signed an agreement with the Jamaican Government to invest $100 million in infrastructure and equipment improvement at KCT, Kingston main terminal, in exchange for a 35-year lease. More recently, in October 2013, Terminal Link, CMA-CGM’s terminal operating subsidiary in which China Merchant Holding International owns 49%, was prequalified by the Development Bank of Jamaican as a potential bidder to take over KCT, as part of the privatization effort of the Jamaican Government.

CMA-CGM uses T&T as a secondary hub for distributing cargo to the Eastern Caribbean Islands, North Brazil, Guyana and Suriname. In the past, the line was interested in developing its own terminal in Point Lisas.

In T&T, CMA-CGM has 7 services, including 4 mainlines and 3 feeders. It is by far the largest user of POS with its traffic amounts for 52% of the total port traffic. CMA-CGM mainlines that call T&T are all Caribbean Specialists, including:

- **Asia / Mexico / Caribbean (PEX2)** – a long service, provided by 12 x 5,000-TEU ships, together with CSAV and CSCL, calling both Balboa and MIT in Panama, then Kingston, Caucedo, Puerto Cabello and POS as the last port of call. This service employs the largest ships calling T&T and accounts for most of CMA-CGM traffic at POS.

- **Brazil / Caribbean (BRASEX)** – a long service, provided by 10 x 2,500-TEU ships, calling at all major ECSA ports, including the Amazon River’s Manaus and 4 ports in the Caribbean Region. Interestingly, in the past this service was provided jointly with Maersk. According to the local CMA-CGM representative, Maersk quit the service due to inadequate port services.

- **USEC / Caribbean (CAGML)** – also a long service (10 ports of call), provided by relatively small, 4 x 1,200-TEU ships, allowing it to call directly at relatively small Caribbean ports.
Interestingly, the service calls at both POS and Point Lisas. We understood that the Point Lisas’ call is in response to a specific consignees’ request.

- Europe / Leewards Islands / French Guiana / N Brazil (NEFGUI) – A joint service with Marfret, provided by small, 6 x 1,600-TEU ships.

In addition to the above-mentioned mainline services, CMA-CGM has a network of feeders, mainly to the Eastern Caribbean Islands, Guyana, Surinam and N Brazil, employing much smaller ships.

CMA-CGM has several Caribbean Specialist and, especially, Through-Caribbean services that do not call T&T, but may include such calls in the future. These services include:

- Med / North Europe / Caribbean (MEDCARIB) – an elaborate service similar to the other “traditional” CMA services, provided by 6 x 2,600-TEU ships, together with Marfret, focusing on Pointe-à-Pitre as the first and the last call in the Caribbean.

- Europe / WCSA (Eurosal) – the two Eurosal “slings”, provided jointly with Hamburg Sud and Hapag Lloyd, employing ships ranging 3,500 – 4,200 TEUs, which only call in Panama, Cartagena (Sling 1&2) and Caucedo (Sling 1).

- NCSA / GCNA (GBX) – a relatively-short service, provided jointly by CMA-CGM and CSAV, employing 4 x 2,500-TEU ships, which only calls Kingston both northbound and southbound.

- ECNA / ECSA (Parana) – a major service is provided jointly by MSC, CMA-CGM, CSAV and Zim, employing 10 x 6,700-TEU ships (the largest ship reaches 7,500 TEU). Currently, the service rotation includes 3 Caribbean calls at Caucedo, Kingston and Freeport.

Our discussion with CMA-CGM suggests that there is a possibility that a T&T call could be added to the above services, assuming adequate terminal and efficient services are available.

**Figures 3-12, 13 and 14** show the rotation of PEX2, MedCaribe, BRASEX and Parana.
MSC

MSC, based in Geneva, Switzerland, is the second largest shipping line of containers worldwide. Recently, MSC has been involved in massive ship building, closing the gap between itself and the leading line, Maersk. In the Caribbean Region and in T&T, MSC activity is relatively modest. The only mainline service that MSC has in T&T (POS) is the Brazil / US Gulf Coast, operating by 7 x 2,500 TEUs. MSC also is the main partner and ship provider in the CMA-CGM ECNA / ECSA (Parana) service discussed above.

MSC uses three hub ports in the Caribbean Region: Freeport, Bahamas and, to a lesser extent, Caucedo, Dominican Republic and Cristobal, Panama. MSC also calls at Kingston with its ECSA/GCNA service employing 5 x 4,000-TEU ships, which also calls at Caucedo.

Maersk Line

Maersk Line, based in Copenhagen, Denmark, is the largest shipping line worldwide. Maersk also has a wide network of Caribbean services, second only to CMA-CGM. Its main hub port is MIT. In the past, Maersk also used Kingston as a hub, where a sister company, APMT, was managing the terminal for the local port authority. Maersk activity in T&T is somewhat limited,
with a single, bi-weekly call by a feeder of about 1,500 TEU, the La Guaira Feeder, between MIT, Point Lisas and La Guaira. Hence, unlike CMA-CGM, Maersk connections to Asia, Europe and ECSA are all provided through MIT. In this respect it should be noted that following Maersk’s shifting of its AWP to AWS, the connection to Asia involves rail transportation between MIT and Balboa.

Maersk Through-Caribbean services include only one service, ECSA / GCNA (Gulf Express). Maersk’s network of Caribbean Specialist services includes 3 European services (CRX, French Antilles and TA5) and 2 ECNA services. Maersk has its own network of feeder services in the Caribbean Region while also using common feeders (CFS) and short-sea lines (Crowley). On January 2014, Maersk announced the creation of a new subsidiary, SeaLand, intended to focus on the Americas trades, including the Caribbean, in order to enhance its involvement in these markets. No specific plans have yet been published although it seems that SeaLand could mainly serve as a dedicated feeder for Maersk’s Through-Caribbean services, especially the Cross-Canal ones.

Currently, Maersk serves the ECSA/Caribbean trade via its Gulf Express service, a Through-Caribbean, ECSA/GCNA service, which only stops at Cartagena (northbound) and Caucedo (Southbound).

**Zim Line**

Zim, based in Haifa, Israel, is a global line, serving almost all major east/west and north/south trade lanes with the exception of Asia/Europe and WCSA/WCNA. Zim service T&T via CFS, a common feeder, with all connections are through Kingston.

The most relevant mainline services of Zim in the Caribbean Region are its two Through-Caribbean Services: (a) ZCP, an AWP, deploying 5,000-TEU ships; and (b) North South Express, an ECSA/ ECNA, in which Zim is only a slot charter. The latter is a joint service with MSC, CMA-CGM, CSAV and Hapag Llyod already reviewed while discussing CMA-CGM and MSC. Both services call at Kingston, which serves as Zim’s main hub in the Caribbean and whereby Zim accounts for about 60% of the traffic when counting both the traffic of its own ships and the related feeder ships. The two mainline services are calling at Kingston both northbound and southbound, a total of 4 weekly calls.

**CSAV**

CSAV, based in Valparaiso, Chile, specializes in South American services. CSAV has several Through-Caribbean and Caribbean Specialist services, either alone or as joint services with others. In T&T the only service currently offered by CSAV is PEX2, contributing 3 out of the total 12 x 5,000-TEU ships in this service discussed above in the section on CMA-CGM. However, using King Ocean (see later) as feeder, CSAV offers worldwide connections. According to the local agent, in the past, CSAV was interested in using POS for feeding the Brazilian trade to Venezuela.
Other global shipping lines active in the Caribbean are Hamburg Lloyd and Hapag Lloyd. The services of these lines are not discussed here due to their limited involvement with T&T trades.

Caribbean Feeder Services (CFS)

CFS, based in Florida, is reportedly the largest feeder line operating in the Caribbean. It is a “pure” common feeder that only handles the boxes of mainlines and is not involved in direct trade. The ships deployed in the Caribbean services range 500 – 1,000 TEUs. CFS annual transport volume is about 250,000 TEUs.

Figure 3-15 shows the entire service network of CFS. As seen in this figure, CFS has 8 separate short services, each focusing on a different feedering range. CFS main hub port is Kingston, but it also uses MIT and CCT in Panama, Caucedo and Cartagena as secondary hubs. The only service calling T&T (POS), employing 2 x 1,100-TEU ships, is the Island Services (brown line), combining calls in Barbados, T&T and Venezuela. The advantage of having multiple short services is flexibility. It allows CFS to quickly modify service rotations and ship’s capacity, based on changes in trades. The disadvantage is the use of relatively small and expensive ships. CFS does not call in Cuba because of the US embargo (see later Mariel).

Figure 3-15. CFS Feeder Network

X-Press Container Line (XCL)

XCL, based in Singapore, claims to be the largest common feeder worldwide with a current fleet of 80 ships, 15 of which are owned, including 2 newbuildings. Worldwide, XCL operates in 6 major hubs and having an annual throughput of 3.2 million TEUs in 2012. Its regional head office for the Caribbean is in Panama, which also serves as its regional hub ports. Figure 3-16 shows the service map of XCL’s 6 services.
In the Caribbean region, X-Press provides 5 services, all use Panama's Atlantic ports of MIT and CCT as hubs, including: Central America, Venezuela, Colombia, Island (Dominican Republic and Puerto Rico) and Jamaica. All services have weekly frequency with the first four provided by 2 ships and the fifth by a single ship. XCL’s ship size ranges from 500 to 1,500 TEUs. One service is provided jointly with Evergreen.

XCL is currently not involved in feedering in the Eastern Caribbean and Cuba.

**Figure 3-16 X-Press Feeder Network**

---

**Crowley Maritime**

Crowley, based in Jacksonville, FL, is a Florida/Caribbean Specialist with a comprehensive network of services. In addition to liner services, Crowley is involved in bulk transportation and tug services. Crowley’s service networks includes 4 US ports, Port Everglades, Jacksonville, Houston and Philadelphia, from which it provides connections to most of the Caribbean ports. **Figure 3-17** shows the rotation of the Eastern Caribbean service. As seen in this figure, in addition to T&T (Point Lisas), Crowley calls directly at St. Croix, St. Vincent and Barbados. Crowley uses its terminal in Barbados and St. Thomas as a regional hub for the Eastern Caribbean. This strategy of using northern East Caribbean ports as hubs is common to most US/Caribbean Specialists, since most of the US/Caribbean trade is inbound (imports) and using T&T has a hub will involve long transit times. Crowley’s services, like all Florida/Caribbean services, calls the same day of the week. The service is provided by 2 ships, the largest of which has capacity of 1,900 TEUs (199 x 32 x 8.5 m).
Despite being a US carrier, Crowley is also serving Cuba, taking advantage of the easing of the embargo on the shipment of agricultural commodities, medicine, medical devices and other humanitarian goods. Crowley announced that beginning February 2013 it will switch its call on the Island from Havana to the new terminal in Mariel (see later).

Recently, Crowley and Seaboard announced a new joint service between Port Everglades and Miami in Florida and Port Limon and MIT, employing 2 x 2,500-TEU ships. As will be discussed later, we expect further consolidation ("rationalization") among Florida/Caribbean Specialists, resulting in the deployment of larger ships. In this respect it should be noted that all the Florida/Caribbean Specialist shipping lines are member in the Caribbean Shipowners Association, an organization of ocean common carriers serving the Caribbean region, whose purpose is to “maintain competitive, non-destructive liner services in the trade for the purpose of fostering commerce and stability”. The Association is a venue for lines to discuss rates and other issues related to the trade.

Crowley is the only Florida/Caribbean Specialist to employ US-flag ships, allowing it to provide services between US mainland and Puerto Rico. In November 2013, Crowley ordered new 2x2,400-TEU, 26,500 dwt powered by LNG. In addition to containers, the new ships will have RoRo capacity for 400 vehicles. The new ships replace Crowley’s aging 6 RoRo tug-barge systems. These ships will provide Crowley with additional capacity which, in turn, could be utilized by the line to serve other Caribbean destinations.

---

Seaboard Marine

Seaboard Marine, based in Miami, is another major Florida/Caribbean specialist. Seaboard has an extensive network of Caribbean services, serving three US ports: Miami, Houston and New Orleans. Figure 3-18 shows the rotation of its Miami/Eastern Caribbean service. The service is provided by 2 ships of about 1,000 TEUs (130 x 18 x 7.2 m, 8,000 dwt). As was the case with Crowley, T&T (Point Lisas) is the last port of call in the Eastern Caribbean range. Interestingly, unlike Crowley, the service also calls directly at Guyana and Suriname. These calls are enabled by the smaller ships employed by Seaboard, with relatively shallow draft. Point Lisas is the largest shipping line serving Point Lisas.

Tropical Shipping

Tropical, based in Riviera Beach, FL, has probably the most extensive network of Caribbean services, consisting of mainline and feeder services. Figure 3-19 shows Tropical’s Caribbean route map. As seen in this figure, Tropical provides connection to Canada in addition to the Floridian ports. The service to T&T (Point Lisas) is provided by 2 sister ships of 950 TEUs (150 x 22 x 8.3 m, 11,000 dwt). Tropical also uses T&T as a hub for its service to Guyana and Surinam.
SeaFreight

SeaFreight, based in Miami, maintains 2 regional services, to the Eastern and Western Caribbean, employing a fleet of 9 x 1,100 and 2 x 500-TEU ships. The service that calls T&T (Point Lisas) is the Western Caribbean, which also calls Venezuela and Suriname. The service has a long route and provided by 3 chartered ships of 1,100 TEUs (166 x 25 x 9.5 m, 18,000 dwt). These ships are currently the largest employed by the Florida/Caribbean Specialists for the Eastern Caribbean. Figure 3-20 shows a picture of one of these ships. As seen in this figure, the ship has 2 cranes on-board allowing it to call at ports without adequate shore cranes.

In addition to serving its own trade, SeaFreight also serves as a feeder for several mainlines, focusing on Kingston where its US services call twice, southbound and northbound.
King Ocean and Bernuth Lines

The 2 lines, both based in Miami, joined operations in September 2012 and since then have been operating under the name of King Ocean. King Ocean maintains 7 services to the Caribbean / Central America region from Florida using a fleet of about 15 ships. The service to T&T is provided by 2 ships of about 500 TEUs (100 x 19 x 6.7 m, 5,600 dwt). The service calls both at POS and Point Lisas. In addition, King Ocean has a single-ship feeder from POS to Barbados, Suriname and Guyana.

3.3. Future Changes and Transshipment Potential

Impact of Canal Expansion on Caribbean Services

In our foregoing discussion of the impact of the Panama Canal expansion we observed that: (a) the overall impact of the expansion on diverting Asia/ECNA trade to AWP services from competing AWS and Transpacific/Bridge services is likely to be limited; (b) in any event, AWP services are not expected to call at T&T; and (c) the Asia/ECSA services are not expect to change their current route via Cape of Good Hope to via Panama Canal and therefore are unlikely to call at T&T. Consequently, the impact of the Canal expansion on T&T prospects as a Caribbean transshipment hub is limited, if any.

Still, there are several trends, unrelated to the Canal expansion, which may provide T&T with transshipment opportunities as will be elaborated below.

Through-Caribbean Supplanting Caribbean Specialists

Figure 3-10, already discussed in Section 3.2, presented the main Through-Caribbean service patterns. The ECSA/ECNA and ECSA/GCSA are both sailing through the Caribbean Region and, unlike the AWP, also stop at Caribbean hub ports. The Through-Caribbean services are longer than the respective Caribbean Specialist services and also serve larger trading regions. Therefore, the Through-Caribbean services employ larger and more economical ships than the Caribbean Specialist services, some of which are legacy services. As evidenced by rationalization in service pattern in other world’s regions, it is quite likely that the Caribbean Specialist will be consolidated into the larger Through-Caribbean services which, in turn, will employ larger ships. This consolidation also will generate transshipment potential for T&T ports, assuming they have the right facilities to efficiently handle the larger ships of the Through-Caribbean services.

For example, CMA-CGM, the shipping line most involved in the Caribbean trades, has 2 Caribbean Specialist services serving the ECNA/Caribbean trade and the second the ECSA/Caribbean respectively: CAGMIL (4 x 1,200-TEU ships) and BRASEX (11 x 2,500-TEU ships). Both services call T&T (POS). CMA-CGM is also a partner in PARANA (8 x 6,700-TEU ships) serving the ECNA/ECSA trade, which stops in Caucedo and Kingston, but not T&T. CMA-CGM may decide in the future to modify its service system by replacing the GAGMIL and BRASEX with another PARANA-like service based on larger ships. If at this point T&T offers modern port facilities, it could well be that T&T will be included in the new and, perhaps, also
the existing services as a third Caribbean hub and, perhaps, even replace Caucedo. Figure 3-21 shows the two Caribbean Specialists on the top and the Through-Caribbean which replace them on the bottom, using the present rotation of the CAGMIL, BRASEX and PARANA services of CMA-CGM. This figure is NOT based on CMA-CGM actual plans but on possible future developments.

The replacement of Caribbean Specialists by Through-Caribbean could also work against T&T. For example, T&T main service, PEX2 (Figure 3-2), could be replaced by future AWP service based on post-Panamax ships, feeding the Caribbean Region through Panama Atlantic hubs, similar to MOL (Figure 3-4).

As seen above, future rationalization of services and related change in service pattern could generate additional transshipment traffic for T&T; alternatively, the rationalization result in a major decline in T&T’s transshipment traffic. There is inherent uncertainty in transshipment traffic.

Figure 3-21 Conceptual Service Consolidation

Rationalization of the Florida/Caribbean Specialists

The US and especially Florida, is the main trading partner of the Caribbean Region. As noted above, the trade is presently handled by many, relatively-short services provided, in the case of the Eastern Caribbean, by relatively-small ships ranging 500 – 1,100 TEUs, some of which are geared and quite old. Almost all services are based on direct calls at all ports. Geared ships, or ships with cranes on-board, are more expensive than gearless ships because of both
the cost of these cranes and the ship capacity that they take. However, geared ships are necessary for smaller ports lacking modern shore cranes.

We already described the growing worldwide trend for “alliancing” among shipping lines intended to consolidate traffic volumes, rationalize service patterns and deploy larger and more efficient ships. A similar trend is likely to develop in the Florida/Caribbean trade, whereby 2 or even 3 lines could create a regional alliance. A case in point is the above-mentioned announcement of a joint service by Seaboard and Crowley between Miami/Port Everglades, Costa Rica and Panama provided by 2 x 2,500-TEU ships. It is reasonable to assume that a similar consolidation in the Eastern Caribbean services will result in deployment of similar-size ships and, perhaps, even larger, and most probably gearless. The rotation of the consolidated service will only include the main Caribbean ports which, in turn, will serve as hubs for the smaller ports.

T&T location to the south of the Eastern Caribbean is not conducive for turning the Island into a regional transshipment hub relative to the US/Caribbean trade. Still, having modern port facilities may induce shipping lines to use it as a hub for the adjacent islands, Suriname and Guyana. For example, in the case of Crowley service presented in Figure 3-17, the consolidated service could substitute direct calls at St. Vincent and Barbados by feeder ing through T&T, or in the case of Seaboard service presented in Figure 3-18, a T&T based feeder could substitute for the direct calls in Georgetown, Guyana and Paramaribo, Suriname.

**Prospects of Transshipping Venezuela**

Venezuela is a major trading nation with a large economic potential. Up until a few years ago, all global lines used to directly call at its main ports with mainlines. The shift to feeder ing happened mainly because of the deterioration in the quality of port services along with the reduction in trade volumes in recent years. Presently, Venezuela’s ports lack the facilities to efficiently handle mainline containerships. Hence, most lines avoid direct calling at Venezuela preferring to use either their own or common feeders. The only major line calling Venezuela directly is CMA-CGM with two of its main services: (a) PEX2, an Asia/Caribbean Specialist service of CMA-CGM/CSAV/CSCL, provided by 5,000-TEU ships, which also is the largest service calling T&T; (b) GBX, a GCNA/NCSA service, provided by 3,000-TEU ships which does not call T&T.

Venezuela has 2 major ports: Puerto Cabello and La Guaira with a total traffic of about 1.39 million TEUs (2012). Venezuela’s total traffic, which also includes 2 other smaller ports, is 1.54 million TEUs. Based on interviews with shipping lines and analysis of shipping line service rotations, we estimate that about 40% of Venezuela traffic is presently fed ered. Accordingly, Venezuela generates about 1.3 million TEUs of transshipment traffic (1.54 x 0.4 x 2).

Cartagena is the main transshipment hub also for both CMA-CGM and other shipping lines serving Venezuela. Venezuela, in turn, is the largest generator of transshipment traffic in Cartagena, accounting to about 30% of its transshipment traffic. The Panama/Atlantic terminals, especially MIT, are the second largest transshipment hub for Venezuela, with the latter accounting to about 25% of MIT’s transshipment traffic. We also estimate that
Venezuela transshipment traffic accounts for about 20% of Kingston’s traffic and 15% of Caucedo’s traffic.

The allocation of Venezuela’s transshipment traffic between the various transshipment hubs is mainly according to trade lane: Panama handles the Asian trade; Cartagena the European, WCSA and ECSA trades; Kingston a mixture of all trades; and Caucedo mainly ECSA trades. Venezuela’s trade with the US is limited and handled primarily by direct services. This also is the case with the Caribbean / Central American trades.

T&T is presently not serving as a hub for Venezuela although due to its location it could assume this role for the ECSA trades. T&T is much closer to Venezuela than Cartagena. For example, the distance between POS and Puerto Cabello and Puerto La Guaira are 420 and 353 NM vs. 747 and 805 NM for Cartagena. Moreover, the ECSA to Venezuela which currently transshipped in Cartagena, traverse these distances twice, back and forth. For example, the second mainline of CMA-CGM calling POS, BRASEX, an ECSA/Caribbean specialist provided by 2,500-TEU ships, does not call at Venezuela. Instead, the BRASEX (Figure 3-3) sails directly from POS to Cartagena. From there, the line has a dedicated feeder, CARIFEED, provided by 1,000-TEU ships linking Cartagena with Venezuela’s ports. A more effective linking could be provided at T&T ports.

Feeder ing the ECSA trade with Venezuela could generate large transshipment volumes for T&T, mostly at the expense of Cartagena and MIT. However, Venezuela’s port situation may change. According to recent news, China Harbor Engineering Co. has pledged an initial $600 million for development and refurbishment of Venezuela’s ports, most of it is likely to be used for building a new terminal at Puerto Cabello. More details on this project will be provided in Section 5.14 devoted to this port. It is quite likely that once a modern port is developed in Venezuela, shipping lines will call their directly with their mainlines, eliminating most of the Venezuela-related transshipment.
4. Analysis of Competing Container Facilities

4.1. General

The objective of this chapter is to analyze the supply side or the Caribbean container market or the facilities of container ports. Chapter 3 of this report analyzed the demand side or the throughputs of T&T ports and their Caribbean competitor. The analysis of the Caribbean container ports includes the following issues:

- Institutional Setting—ownership and operation;
- Main Facilities—location, water access, land access, terminal area, berth and shore equipment, yard and yard equipment, gate;
- Operations and Productivity—the throughput, main lines, and operational performance of the above facilities, mainly moves per crane and per berth-hour (see below);
- Tariff—ship-to-gate “all in” tariff for domestic and transshipment, including incentive programs;
- Capacity—the annual throughput that can be handled under reasonable assumptions of operational performance; and
- Expansion Plan—planned facilities, their capacity, phases and dates, investments, institutional arrangement, and prospects.

The level of detailed of the analysis of the above items depends on ports. Naturally, the analysis of T&T ports is conducted at a higher level.

Before the detailed analysis of ports, we review productivity briefly, which according to our interviews with shipping lines is the most critical in assessing the competitive position of T&T ports.

4.2. Productivity

The concept of productivity in marine terminal usually refers to the operational performance of the terminal in serving ships. The two common indicators to assess this performance are crane productivity and berth productivity. Crane productivity relates to the number of crane moves, or boxes transferred between ship and shore during crane’s working hours. Berth productivity relates to the number of boxes transferred between ship and shore by all cranes serving this ship during its working hours, usually defined as the elapsed time between first and last box. The two indicators are directly related; higher berth productivity is the result of more cranes assigned to work the ship and higher productivity achieved by each of them.
Crane productivity is affected by the technical characteristics of the crane (e.g., lifting speed, twin lifting, anti-sway, etc.), labor proficiency and ship’s stowage plan. Berth productivity is affected by the availability of cranes, management decision to deploy them for handling a particular ship and, again, ship’s stowage plan which determines the number of cranes that can be effectively deploy per ship. Ports’ main interest is crane productivity, since the common tariff system is per box moved. Shipping lines’ main interest is berth productivity, since in addition to port tariff they incur the cost of the ship itself.  

A more detailed analysis of operational performance also relates to the other components of the port, mainly the storage or container yard and gate. Moreover, the yard performance is affecting crane and berth productivity and often even determines the entire terminal capacity. However, since the assessment of container terminal in this study is conducted at a strategic level, the focus in the sections of terminal productivity will be on crane and berth productivities. 

The following sections begin with a critical review of T&T main ports and then proceed with their main competitors. The review of T&T competitors begins Kingston and Caucedo, considered the most relevant and hence assessed in details; then it moves to the rest of the Caribbean transshipment hubs and conclude with neighboring ports that may expand their facilities to induce direct call at the expense of T&T transshipment traffic. The analysis of tariffs will be included in one section, comparing the tariffs of a sample of ports.

**Port of Spain**

**General**

The Port of Port of Spain (POS) is a business unit of the Port Authority of Trinidad and Tobago. Since the Authority is a state enterprise, the Port is essentially part of the national government. We understood that there were two efforts in recent years to include private sector participation in the Port, but both have failed mainly due to labor objection.

Currently POS maintains an employee establishment of approximately 1000 persons, comprised of managers, terminal and equipment operators, stevedores, longshoremen and administrative staff. The labor force at the port is unionized. Our interviews with POS management and with shipping lines indicate that union rules are considered a major impediment for achieving higher operational performance along with cost savings.

**Water Access**

The port is access via Grier Channel, approximately 8.5 km in length, 122m in width and with a dredged depth of 12 m CD. The turning basin has a diameter of 550 m. The channel is marked with buoys, some of which are lighted, allowing day and night navigation. The pilots also indicate that because of the channel orientation, the tide creates a cross current.

---

12 The largest cranes, defined as super-post-Panamax, have a reach of 25 rows of containers. Berth productivity in leading container terminals worldwide is over 200 moves/hour, achieved while handling the 23-wide 18,000-TEU ships with 6 cranes, reaching at time 35 – 40 moves/hour (Port Technology, 11-20-2013).

13 Likewise, reliable data on yard and gate performance is difficult to obtain.
mandating a lateral shift of the ship which, in turn, requires a wider path for navigation. As a result, although the widest ships are 32 m, the 122-m channel width is insufficient for two-way navigation. The pilots suggest examining the possibility of realigning the channel if larger ships are considered expected in the future.

Another limitation relates to the channel depth. According to the Pilot Association, the largest ships currently calling POS are full Panamax, with dimensions of 295 x 32 x 13 m (LOA x beam x draft), while the allowed vessels draft during all time is only 11 m, equal to 90% of channel depth. This leaves for the full Panamax ships a very narrow time interval during which they can safely enter/exit the port, the high tide period during day time. The result of this constraint is that these ships often wait up to 24 hours in each direction. The problems in accessing POS are also reported in our interview with CMA-CGM, the main operator of these ships.

**Land Access**

The road access to the port is through the main access road to the City of Port of Spain. Hence, trucks entering the port have to cope with city traffic, resulting in congestion and delays during rush hours. However, the truck traffic generated by the port is small relatively to the non-port traffic. Also, if the destuffing activity and some of the empty storage activity are removed from the waterfront terminal (see later), a significant portion of the port traffic will be eliminated. The port has a modern gate facility, with canopies and pre-gate parking for trucks. No waiting line at the gate was observed during our visit. Likewise, the port’s operations people observe that the gate is rarely congested. It should be noted that about half of the port activity is transshipment, or ship-to-ship transfer, which does not involve the gate or the road outside the port.

**Present Facilities and Equipment**

Figure 4-1 shows a schematic layout of the port. The hatched, colored areas are related to an expansion plan intended to increase storage areas. The total marginal berth length of the port is about 2,000 m. Part of this length is already taken by Hyatt Hotel and the Water Taxi Service, leaving about 1,500 m for cargo handling. Figure 4-2 shows the list of the cargo berths according to their present usage and dimensions. As seen in this figure, Berths 3 & 4 are shallow (9 m) and have a narrow back-up area, most of it taken by transit sheds. The first shed from the east serves as passenger terminal. Hence, Berths 3 & 4 cannot be developed as container berths, reducing the developable berth length available for handling containers to about 1,100 m. The present container activity is concentrated in Berths 6A & 7, the only berths served by Ship-to-Shore (STS) or gantry cranes, with a total length of 500 m, sufficient for one mother ship of 250 – 300 m LOA and one feeder ship of 150 – 200 m LOA. In order to expand the useful berthage, a Mobile Harbor Crane (MHC) was purchased and assigned to Berth 5 & 6. These berths also are used for auto import. Berth 8 is not active presently; it was originally used for handling bulk cargoes and still has an unloading gallery which blocks the access to container ships.
The Port Authority owns 151.8 ha of waterfront land, extending from Beetham Highway in the East to Invaders Bay in the West. The port utilizes only 48.41 ha of its land for port operations. It leases 78.04 ha, with the remaining 25 ha located in East Sea Lots, outside the main port. This area has been earmarked for future port development, which also included the expansion of the present ferry services.

According to the Port Authority, only 25.6 ha are actually used for cargo handling: 14.6 ha are used for full container storage, 6.4 ha for empty container storage, 2.4 ha for cars and 2.2 ha for covered warehouses. The full container storage includes 2.1 ha previously occupied by Shed 9. This shed was recently demolished and its underlying area converted to a container yard, adding 200-TEU ground slot. With the additional slots, the total number of ground slots at the port is 2,500 TEUs.

The container handling equipment includes 4 STS cranes, 1 MHC, 14 Rubber-Tired Gantry (RTG) cranes, 8 Reachstackers and 9 empty-container handlers. The STS cranes are with 50-ft gauge; newer STS cranes are with 100-ft gauge, allowing for better traffic flow resulting in
increased ship-handling productivity. Only 2 STS are new with the rest are of older vintage with limited reach that cannot serve large ships. Moreover, only one of the newer STS cranes has sufficient height to handle the 5,000-TEU ships with boxes stacked 7-high on deck, a major constrain. The RTGs are also of old model with total stacking height of four (one-over-three); newer RTGs are six or seven high, providing for much higher storage density. Because of their age, the RTGs have many maintenance problems and about one third of them are always down.

Traffic
The analysis in Chapter 3 already provided statistics on POS traffic.

POS management did not provide us with traffic statistics broken down by line. Based on our interviews with lines, we estimate that CMA-CGM is by far the largest line, followed by MSC.

Operations and Productivity
Figure 4-3 shows a chart illustrating the POS crane (STS) productivity during the 2007 – 2011 periods, based on the Strategic Plan.\textsuperscript{14} According to our interview with the management, crane productivity rose to 16 moves/hour earlier in 2013, but more recently declined to 15 moves/hour and perhaps, even lower. The reason for the decline in productivity is yard congestion: the STS cranes are delayed by the RTGs, especially during loading outbound boxes. The RTGs, in turn, cannot produce the required boxes since they need to “dig” for them in the yard stacks which, because of shortage in yard area, are stacked too high. According to the management, the stacking height often reaches 4, the maximum possible, instead of the desirable 2.5. Likewise, the number of RTGs cranes and yard tractors is below that required to serve the STS cranes.

Figure 4-3 Port of Port of Spain Crane Productivity

The data available in Figure 4-3 does not include berth productivity. Likewise, the data is too general for conducting a more thorough analysis. Shipping lines usually are more concerned with berth productivity, or moves/berth-hour (or ship-hour at berth) than with moves/crane-hour, especially for larger ships that are served by several cranes. Also shipping lines are

\textsuperscript{14} Port Authority of Trinidad and Tobago, A Synopsis of the Strategic Plan – Fiscal Years 2012 – 2016, April 2012.
concerned with the total port time of their ships, which also includes waiting time for berth and idle time (unproductive) on berth. CMA-CGM, the operator of the PEX2, the largest service calling at POS with 5,000-TEU ships, provided us with detailed operational data on a small sample of ships. Our analysis of this data indicates that these ships, handling an average of 1,507 moves, were served by an average of 1.3 STS cranes; usually the ships began operations with 2 STS and after a few hours shifted to a single STS. Average crane productivity was 17.3 moves/hour and average berth productivity about 23.5 moves/hour. This productivity level is well below that common for modern STS cranes serving ships of similar size and number of moves. The data also revealed that PEX2 ships’ berth time was 83 hours.

The operational performance of POS is not in line of that common in major container terminals. Figure 4-4 shows a chart of the berth productivity recorded during a study on the capacity of the Chilean port of San Antonio by members of this study team. As seen in this figure, the productivity depends on the number of moves (call size), which is a proxy to ship size. The larger the ship, the more cranes can simultaneously handle it and the higher the berth productivity. Figure 4-5 shows a table with performance indicators compiled in 2011 as part of a comprehensive survey of 10 South American ports conducted by Nathan for the Inter-American Bank. The low berth productivity at POS stems from unavailability of enough STS cranes and the low crane productivity. For example, a 5,000-TEU ship with 1,500 moves, similar to those employed by PEX2, is usually handled in modern well-equipped ports by 3 STS cranes for about 2/3 of the time and 2 cranes during 1/3 of the time, with an overall average of about 2.3 cranes – almost twice the number of cranes presently provided in POS for a similar ship. Based on Figure 4-5, crane productivity should reach 25 – 30 moves/hour; multiplying it by 2.3 results with berth productivity ranging 55 – 69 moves/hour, which indeed is the range presented at Figure 4-5. Hence, a well-equipped and efficiently-operated terminal in POS should serve a 5,000-TEU ship at a rate of about 60 moves/hour, completing the handling of this ship within 24 hours. The actual berth time of PEX2 ships as noted above was 83 hours.
The berth time discussed above only relates to the time the ship is actually berthed, including preparations before work and idle time during work due to meals, breakdowns, etc. Ship’s total port time, the main concern of shipping lines, also includes ship’s waiting for berth (anchor time). POS, like most ports, has a berthing window system. However, ships often have problems adhering to their windows. Ships that miss their windows are moved to the end of the queue which, in turn, increases their waiting time and total port time. In our sample, only one ship made it on time for its assigned window and therefore did not wait on anchor. The other ships were late, missed their windows, and had to wait an average of 55 hours. In
addition, PEX2 ships had an average wait on berth of 24 hours. One of the reasons for PEX2 ships being late is that POS is their last port of call in the Caribbean before heading back to Asia and therefore suffers from delays in the ports preceding it. Being the “Last Out” port also hurts productivity, since the ship is almost full and the boxes have to be distributed over many hatches.

**Previous Efforts to Improve Productivity**

The issue of low productivity at POS was observed as the most critical by all shipping lines interviewed by us. Apparently, the issue has been afflicting POS for long time and therefore extensively addressed in the latest POS Strategic Plan: “The engagement of a container terminal management consultant from 2006 – 2010 as a strategic driver for productivity improvement and expansion of market share failed to achieve either initiative due to several factors including an inadequate level of capital investment.” The impact of this failure is later on described: “The decline in business is as a result of POS not being able to keep pace with the level of port reform required to be competitive. Technological innovations in container terminal operations, space and equipment modernization are the norms in the industry and POS operates behind the curve in these areas. POS is also constrained by the antiquated work practices in its operation which negatively impact employee productivity”. We agree with the statements above.

**Capacity of Present Facilities**

According to POS management, the container terminal capacity is determined by its yard, or storage capacity. Storage capacity is determined, in turn, by the number of storage slots for boxes available at the waterfront yard and the dwell time of these boxes inside the yard. Presently, the average dwell time is 7.3 days, based on 8 days for imports, 7 days for exports and 7 days for transshipment. The Strategic Plan includes a series of yard capacity calculations based on several layout scenarios, beginning with the present yard area and proceeding with several expansion options involving further demolishing of sheds and relocating some of the storage and related activities to off-terminal areas. The overall conclusion of the Strategic Plan, also shared by POS management, is that with the present yard the port presently is operating near capacity or, put differently, the port is almost “full”. We generally agree with this determination – but with reservations mainly related to dwell time assumptions. As noted above, the average dwell time is presently 7.3 days. We believe that further computerization of the administrative and Customs processes along with adjustments of the storage tariff could result in dramatic reduction in dwell time to 3 – 5 days. Such a reduction in dwell time is equivalent to increasing of storage capacity by 50 – 100%.

Regarding yard expansion possibilities, the terminal layout shown in Figure 4-1 indicates a series of yard areas that can be converted to container storage and added to the present storage capacity. As seen in this figure, the full build out plan includes 4,500 ground slots vs. 2,500 ground slots presently available, or increase by 80%. A further increase in capacity can be achieved by replacing the present 4-high RTGs by modern, 6-high RTGs. A similar improvement can be achieved by replacing the present 5-high by 7-high Empty Handlers.
A more radical yard-capacity expansion measure would be to encourage the development of “dry ports” outside the marine terminals (off-dock). The dry ports could provide in-bond storage of domestic boxes along with stuffing/destuffing of boxes (CFS), storage for cargo, distribution center, and storage of empty boxes, reducing the need to provide space for these activities inside the marine terminal and the respective space required for them. The removal of unessential activities outside the marine terminal will also reduce the traffic to/from it.

As seen above, yard capacity depends on many assumptions regarding dwell time, yard equipment, yard expansion scenarios and availability of dry ports. After reviewing the Strategic Plan it seems to us that the assertion “It is estimated that the Port can potentially increase its throughput from the average 388,000 TEU’s per annum to an estimated minimum 1,000,000 TEUs” is reasonable and, perhaps, even on the low side.

The assessment of berth capacity in the Strategic Plan is based on the number of STS cranes. The Plan assumes replacing the older, sub-Panamax STS 001 & 002 with post-Panamax cranes capable of handling 12,000-TEU ships (NPX) and increasing the total number of cranes from 4 to 5. Then, the Plan assumes that each crane can “generate” 160,000 TEUs annually, resulting in total capacity for the port of 800,000 TEUs. Another possibility, not addressed in the Strategic Plan is to convert Berth 8 from bulk to containers, increasing the total berth length served by STS cranes to 800 m. **Figure 4-6** shows a table of Berth Capacity Indicators based on a worldwide study of existing and planned terminals conducted by members of this study team for a masterplan of major South-American ports. The indicators are presented as a function of the type of ships expected to be served at the terminal and the number of berths at the terminal. We prefer using berth length to assess capacity over the number of STS cranes, since berthing is the ultimate constraint on capacity; while additional cranes can be installed, extending berthing is difficult and, often, technically impossible. Based on the present mixture of ships at POS, it seems that the most suitable indicator to select from Figure 4-6 should be about 1,400 TEUs/m. Accordingly, if well furbished, the current 500-m terminal is capable of handling 700,000 TEUs.
Analysis of Competing Container Facilities

Figure 4-6 Berth Capacity Indicators

<table>
<thead>
<tr>
<th>Year</th>
<th>Type of Berth</th>
<th>Berth Length (m)</th>
<th>Berth Alongside (m)</th>
<th>Berths per Terminal</th>
<th>Design Ship</th>
<th>Berth Capacity (TEUs)</th>
<th>Berth-m Capacity (TEUs/m)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2009</td>
<td>Sub Panamax</td>
<td>250</td>
<td>12</td>
<td>3</td>
<td>3,000</td>
<td>350,000</td>
<td>1,400</td>
</tr>
<tr>
<td>2012</td>
<td>Panamax</td>
<td>280</td>
<td>14</td>
<td>3</td>
<td>4,500</td>
<td>450,000</td>
<td>1,607</td>
</tr>
<tr>
<td>2012</td>
<td>Panamax</td>
<td>280</td>
<td>14</td>
<td>4</td>
<td>4,500</td>
<td>495,000</td>
<td>1,768</td>
</tr>
<tr>
<td>2014</td>
<td>Post Panamax</td>
<td>300</td>
<td>15</td>
<td>3</td>
<td>5,700</td>
<td>500,000</td>
<td>1,667</td>
</tr>
<tr>
<td>2014</td>
<td>Post Panamax</td>
<td>300</td>
<td>15</td>
<td>4</td>
<td>5,700</td>
<td>550,000</td>
<td>1,833</td>
</tr>
<tr>
<td>2017</td>
<td>Post Panamax</td>
<td>350</td>
<td>16</td>
<td>4</td>
<td>8,000</td>
<td>700,000</td>
<td>2,000</td>
</tr>
<tr>
<td>2025</td>
<td>Post Panamax</td>
<td>400</td>
<td>16 - 18</td>
<td>4</td>
<td>12,000</td>
<td>1,000,000</td>
<td>2,500</td>
</tr>
<tr>
<td>2009</td>
<td>Multipurpose</td>
<td>150</td>
<td>10 - 11</td>
<td>2</td>
<td>1,000</td>
<td>100,000</td>
<td>667</td>
</tr>
</tbody>
</table>

Expansion Possibilities

As clearly shown in Figure 4-1, past plans for expanding POS included the construction of two new perpendicular berths, Berth 9 & 10, with a total berth length of 1,000 m. The new port area, most of it already reclaimed, was supposed to replace the present port area which, in turn, would be developed for commercial real estate. The Strategic Plan estimates the cost of developing the new berths at $900 million, based on data from Kingston. Another, more ambitious plan proposed in the past, included the construction of a new port at the East Sea Lots area.

It seems to us that both plans are driven mainly by real estate considerations since the existing port, with modest investments, may have sufficient capacity to handle the T&T traffic under any reasonable demand scenario. We already observed that we expect that the Panama Canal expansion, the main future change in the Caribbean Region, will have a limited impact on T&T’s role as a secondary hub. The more relevant future change for T&T is the growth in ship size driven by the combination of service consolidation and cascading of big ships from the east/west services. Accordingly, we do not expect T&T total traffic to dramatically increase or decrease, pending on scenario (see Chapter 8 on Forecast Scenarios). But, if T&T aspires to retain its role as a transshipment hub, it needs to handle Post II of 7,500 – 10,000 TEUs and, perhaps, in the longer future, NPX of 13,000 TEUs. Handling these ships requires at least one 350-m long and 16-m deep berth as well as a 16-m deep channel. Rehabilitating Berth 8 to create a modern post-Panamax berth could add about 200 m to present 500 m berthage, creating a total berthage of 700 m. If Berth 8 is extended all the way to the western border of the terminal, the total length will reach about 800 m or perhaps slightly more. Figure 4-7 shows a schematic layout, with the rehabilitated/new berthage marked in red. According to the berth-capacity indicators presented in Figure 4-6, a well-equipped 800-m terminal has capacity of, 1,120,000 TEUs annually (800 x 1,400). Considering that the rehabilitation process may take 3 years and
assuming that ship mix at that time will include Post II, a more suitable berth capacity indicator would be 1,600 TEUs/m, which will result in terminal capacity of 1,280,000 TEUs (800 x 1,600).

**Figure 4-7 Expanded Layout of Port of Port of Spain**

---

**Institutional Reform**

The recent Strategic Plan states that: “The management of the Port Authority of T&T believes that the Port is well-positioned to play a major role in the country’s diversification efforts. In order to achieve this goal it must adopt a business-oriented focus and become commercially viable. Management recommends that a financial investment / accommodation be made to assist it in effecting the turnaround and sustainability of the cargo handling operations as a matter of high priority”. While not explicitly stated, it seems that the intention in this recommendation is a comprehensive institutional reform leading to some form of privatization. As will be seen in the following sections, most of the Caribbean hubs are privately operated. The main exception is Kingston’s KCT. But even there it was reported that the Government of Jamaica has already began a process of privatization (see Section 4.6).

**Point Lisas**

**General**

The container terminal in Point Lisas is part of Point Lisas Industrial Port Development Corporation (PLIDECO). PLIDECO is 51% owned by the National Energy Corporation, an agency of the national government, and 49% by the private sector. PLIDECO is actively traded on T&T Stock Exchange. Hence, the company is run on a commercial basis, unlike POS which essentially is a government agency.

The container terminal of Point Lisas is located within a large Industrial Estate covering 865 ha, most of which occupied by petrochemical industries.
The Port labor belongs to the same labor union as POS labor. Still, according to its president and shipping lines interviewed by us, Point Lisas’ labor is more dedicated than that of POS, reflected in more efficient operations.

**Water Access**

Point Lisas’ approach channel is much shorter than that of POS, at about 4 km. It is 152 m wide, with depth of 12.8 m; the turning basin is 300 m in diameter. Point Lisas’ channel, like that of POS, is one way. The channel is also used by the nearby bulk terminal.

**Land Access**

Point Lisas is located 32 km south of POS. The entrance to the port is through a local 2-lane road that connects to the same coastal highway that serves POS and, in the future, will also serve La Brea. The local access road is quite busy since it serves the entire PLIPDECO complex. The port has a gate under a canopy with separate inbound and outbound lanes (2 in and 1 out) and a pre-gate parking area for trucks.

**Present Facilities and Equipment**

*Figure 4-8* shows an aerial photo of Point Lisas’ container facilities. As seen in Figure 3-7, the container terminal has two separate berths:

- Berth 4 – dock of 110 m and depth alongside of 11.59 m, served by 3 MHCs; and
- Berth 5 -- dock of 200 m and depth alongside of 11.59 m, served by 2 STS cranes the newer one, purchased in 2006, is post-Panamax.

There are three additional berths that because of their short length, shallow draft or location are not used for handling containers.

The 200-m length of the largest berth at the port limits the size of ships that can presently be handled at Point Lisas to about 2,000 TEUs; the largest ship currently calling Point Lisas is about 1,300 TEUs. Because of this limitation, Point Lisas serves mainly the Florida/Caribbean Specialist services (see Section 3.2).

The total terminal area is 23 ha. The main container yard is about 4 ha; it is served by 6, 5-high RTGs. The port also has 5 reachstackers and 2, 4-high Empty Handlers.

Recently the Port concluded a tendering process for a new MHC to replace an older one.
Figure 4-8 Point Lisas Container Terminal

**Capacity of Present Facilities**
Because of the odd shape of the port it is difficult to assess capacity short of detailed operational data unavailable to us. Still, it seems to us that the port is currently operating at near capacity.

**Traffic**
The total traffic in 2012 was 176,000 TEUs, a 4% increase from the 170,000 TEUs handled in 2011. The port is served by 5 lines: Seaboard, Tropical, Crowley, SeaFreight and Maersk. The first 4 lines are Florida/Caribbean Specialists; Maersk is a feeder using MIIT as a hub. About 85% of Point Lisas’ traffic is domestic with only 15% transshipment. In comparison, POS’ traffic is evenly divided between domestic and transshipment.

**Operations and Productivity**
The productivity of STS cranes, according to PLIPDECO president, is about 20 moves/crane-hour, considerably higher than the 15 moves/crane-hour reported for POS. Berth productivity reaches 36 – 40 moves/hour when working with 2 STS cranes. One reason for the higher productivity of Point Lisas is the use of a “buffer on dock”, whereby the crane grounds the import containers to avoid waiting for yard tractors. The boxes are then mounted on the yard tractor by a reachstacker. The system is intended to increase ship-handling productivity – at the expense of double handling.

The dwell time, according to PLIPDECO president is 4-5 days, or about half that of POS.

**Expansion Possibilities**
Media publications indicated that PLIPDECO fosters an ambitious development plan, including a phased development of 6 new berths. Phase I of this plan includes the construction of 2 berths starting in 2014. We have learnt during our interview with PLIPDECO president that PLIPDECO has hired a management consultant firm to conduct a study on the transshipment potential of T&T which, presumably, the new berths are intended to capture.
The study’s findings were not shared with us. Since, following this study PLIPDECO retained another, engineering consultant to develop an expansion plan, we assume that the first study has identified a promising potential.

During our interview with the port’s president we also were given a drawing of the present port’s layout, which included a continuation of Berth 5 under the marking of Berth 6. Berth 6, according to this drawing, will include a new 300-m dock and 9 ha of container yard. The drawing also includes (a) an 8 ha expansion of the container yard behind Berth 5; and (b) a further extension of Berth 6 and possibly Berth 7. The expansion area is located in a water-covered area and therefore requires extensive reclamation and, perhaps, a breakwater.

The total berth length of Berths 5, 6 & 7 will be 800 m, similar to the expanded berth length of POS. Accordingly, the capacity Point Lisas expanded facilities is equal to that of POS at about 1.28 million TEUs assuming it will be capable of handling Post II ships.

### La Brea

#### General

There is no container terminal in La Brea. The proposed Brighton International Terminal is part of a 196-ha industrial park owned by the National Energy Corporation, which also is the majority owner of Point Lisa.

In the past La Brea area was used for fabrication of offshore platforms for drilling and extraction of oil.

#### Land Access

LB is located about 45 km south of Point Lisas and 105 km south of POS and will be served by the same coastal highway that serves POS and Point Lisas, an extension of it to Point Fortin is presently under construction. This extension is intended to hasten the development of the southern region of Trinidad, especially the south western peninsula. The access road from the coastal highway to the planned port site is a rural road.

#### Water Access

The proposed site has no access channel yet. There is a 680-m long, 150-m wide and 12.8-m deep channel to an adjacent site, including a turning basin of 300-m diameter.

#### Present Facilities and Equipment

The site is not developed yet hence there are no facilities and equipment for handling containers there. Figure 4-9 shows a schematic Phase I terminal development plan prepared for LABIDCO. As seen in this figure, the plan includes 1,060 m of dock and 37.2 ha of upland. It seems that about one fourth of the upland has to be reclaimed. Figure 4-10 shows both Phases I & II, with a total berth length of 1,980 m and 50 ha of terminal area. During our site visit we observed that the soil condition is stable with no streams or marshland on the premise. The sea condition is unclear however and there might be a need for a breakwater. The proposed La Brea site is much larger than either the expanded POS or Point Lisas. The site may include, in addition to containers, facilities for bulk handling and a service dock for supply boats.
There are three active docks adjacent to proposed sites owned by the National Energy Company as seen in Figure 4-8. LABIDCO’s present facility, located at the eastern border,
includes about 3 ha of land, with a 130-m dock. The terminal area has a small lay-down yard and a warehouse. A 5,000 sq m bonded warehouse is presently under construction.

4.3. Categorization of Competing Ports

The following sections present a brief analysis of the relevant Caribbean Ports, those considered either in direct or indirect competition with T&T ports for the transshipment traffic. For the purpose of our analysis, these ports can be divided into two groups:

- **Caribbean Hub Ports** – the ports in which most of the Caribbean transshipment traffic is presently handled; and
- **Neighboring Ports** – the ports in Eastern Caribbean Islands and NCSA presently feedered through T&T ports.

The ports of the first group compete with T&T mainly on feeder ing the ports in the second group, as well as other potential feeder ing ranges, foremost of which is Venezuela. The competition by ports in the second group is twofold: (a) ports within this group could attempt to attract direct calls at the expense of T&T transshipment traffic; and (b) ports within this group could attempt to become transshipment hubs much like T&T ports.

The analysis below begins with the Caribbean Hub Ports, including: Kingston; Jamaica; Caucedo, Dominican Republic; Cartagena, Colombia; Freeport, Bahamas; Panama Atlantic ports; Moin, Costa Rica; Mariel, Cuba; and Ponce, Puerto Rico. The analysis of the present and potential feeder ing ports of T&T include: Pointe-à-Pitre, Guadeloupe; Fort de France, Martinique and Puerto Cabello, Venezuela. Altogether the following review includes 14 ports and terminals.

**Kingston, Jamaica**

**General**

Kingston Container Terminal (KCT) is owned by the Port Authority of Jamaica, a statutory company acting as an agency of the Government of Jamaica. It is operated by Kingston Container Terminal Services, a subsidiary of the Port Authority. Hence, KCT institutional setting is similar to that of POS.

In 2012 the government announced that it is “seeking to grant a long-term concession to a global terminal operator with the necessary experience, market linkages, and capital to operate and expand the KCT through a Private-private partnership”. Put differently, the government decided to privatize KCT. An invitation to participate in the program was sent to global terminal operators and five companies were already pre-qualified: the Port of Singapore; the Terminal Ling Consortium; Dubai Ports; and CMA-CGM’s subsidiary Terminal Link.

As seen above, one of the interested parties is CMA-CGM, the main line calling POS. In 2011, CMA-CGM already signed an agreement with the Port Authority for a 35-year lease of Gordon
Analysis of Competing Container Facilities

Cay Terminal, including a commitment to invest $100 million in improvements of infrastructure and equipment. Apparently, this agreement is valid anymore.

The privatization is intended to improve performance (see below section on Productivity) and, especially, raise necessary investments for the new Fort Augusta terminal (see below section on Expansion Plan), estimated to cost $900 million. The latter is clearly stated in the 2013 annual report (p. 7): “In an effort to address the perplexing issue of infrastructure development financing, the Authority accelerated activities geared towards privatizing the Container Terminal by engaging in discussions with international interests with a view to enhance cost efficiency, mitigate risk and improve the economic viability and profitability of the port.”

Present Port Facilities

KCT is located inside Kingston Harbor, a large natural harbor and therefore does not require a breakwater. Figure 4.11 shows a picture of the existing container facilities in KCT. As seen in this figure, the present KCT complex consists of three terminals:

- North Terminal – 535-m of berth equipped by 4 super-post-Panamax15 and backed by 47 ha of yard space;
- South Terminal – 1,300-m of berth equipped with 5 post-Panamax and 6 super-post-Panamax cranes and backed by 82 ha of yard space of which 25 ha are unpaved
- West Terminal – 475-m of berth equipped with 4 super-post-Panamax cranes and 65-ha yard space, only partially paved.

Altogether, the KCT complex consists of 2,310 m of berthage and 194 ha of container yard, some of it, especially in the West Terminal, unpaved yet. The yard system in all 3 terminals is based on a fleet of 65 Straddle Carriers (Strad). As will be seen later, Strads are also used in Freeport; the yard system in T&T terminals, Caucedo, Cartagena and Panama is based on RTGs.

---

15 Super-post-Panamax cranes have outreach of more than 46 m, capable of handling Post II ships. The newer cranes in POS and Point Lisas
The present access-channel's depth is 13 m. According to recent news the Port Authority began dredging the access channel and the basin to accommodate NPX ships with capacity of 12,000 TEUs and draft of 15.2 m. Reportedly, the depth alongside will be 15 m, the maximum allowed by the dock structure. This depth, however, is not sufficient for handling fully-loaded Post II ships which, with draft of 15.2 m, require a channel depth of 16+ m.

Kingston has a second terminal, Kingston Wharves Limited (KWL), a multi-purpose terminal with 1,600-m berth and 25 ha of waterfront land. KWL is a private terminal that handles mostly Florida/Caribbean Specialists along with some feeder lines. Ship handling at this terminal is done by MHCs.

**Traffic**

In 2012 KCT handled 1.14 million TEUs, 35% below the 1.76 million TEUs in 2011 and similar its throughputs in previous years. Traffic composition in KCT was 88%, domestic 10% and other 2%. Based on our interviews, it seems that the decline in traffic could be attributed to shifting of transshipment activity to other ports, mostly Cartagena. This abrupt reduction in traffic is another indication for the precarious nature of transshipment traffic.

KWL handled 283,000 TEUs in 2012, of which 186,000 TEUs or 66% were transshipment and 97,000 TEUs domestic.

**Figure 4-12** shows the distribution of KCT by shipping lines. As seen in this figure Zim accounts for 56% of the traffic, following by CMA-CGM with 24%. MSC, which began calling KCT only in October 2012, captured the third place with about 8%. Zim is the only line to use Kingston as a hub for its AWP service. Zim takes advantage of Kingston’s central location, using it, to feeder the entire Caribbean Region, including Venezuela, as well as GCNA and NCSA. CMA-CMA uses Kingston mainly as a hub for its PEX2 service, the main service of POS.
It is interesting to note that Maersk does not call at Kingston, although until 2007 Kingston was Maersk’s main hub and APMT even managed KCT.

**Figure 4-12 Kingston’s Shipping Lines**

<table>
<thead>
<tr>
<th>Shipping Line</th>
<th>Market Share</th>
</tr>
</thead>
<tbody>
<tr>
<td>ZIM/ZIMAS</td>
<td>56.0%</td>
</tr>
<tr>
<td>CMA-CGM</td>
<td>21.1%</td>
</tr>
<tr>
<td>MSC</td>
<td>7.8%</td>
</tr>
<tr>
<td>CSAV</td>
<td>5.2%</td>
</tr>
<tr>
<td>HAPAG LLOYD</td>
<td>4.6%</td>
</tr>
<tr>
<td>MAERSK</td>
<td>1.1%</td>
</tr>
<tr>
<td>EVERGREEN</td>
<td>0.5%</td>
</tr>
<tr>
<td>HAMBURG</td>
<td>1.6%</td>
</tr>
<tr>
<td>CHINA SHIPPING</td>
<td>0.7%</td>
</tr>
<tr>
<td>SEAFREIGHT</td>
<td>0.6%</td>
</tr>
<tr>
<td>OTHER</td>
<td>0.8%</td>
</tr>
</tbody>
</table>

**Productivity**

KCT has bad reputation regarding its performance. In our interviews with shipping lines there were many complaints about problems with labor and equipment. KCT claims on its website that crane productivity is 28 moves/hour which, as seen in Figure 4-5, is quite high. No productivity-related data is available in support of KCT’s claim but our interviews with shipping lines confirmed it. We also understood that 5,000-TEU ships are served by 3 – 4 STS cranes.

**Capacity of Present Facilities and Expansion Plan**

KCT is currently at its fifth and last phase of a 5-phase expansion plan devised to increase capacity from 1.5 to 3.2 million TEUs within the existing basin (Gordon Cave). The Port Authority expects to achieve this goal in 2014 by completing the pavement of the yard in the West Terminal and rehabilitating and replacing equipment at the other terminals. Until then, the capacity of the present facilities is estimated at 2.8 million TEUs. Considering that the total berth length now is 1,830 m and applying the Berth Indicators (Figure IV.6), this estimate seems reasonable. Gordon Cave capacity of 3.2 million TEUs is 2.8 times the 2012 throughput of 1.14 million TEUs.

Although the development of Gordon Cave has not been completed yet, the Port Authority recently drew development plans for a new terminal in Fort Augusta. **Figure 4-13** shows a schematic drawing of the preferred development option considered for Fort Augusta taken from the EIA study (September 19, 2013). The new terminal is expected to have a 17-m access channel and capacity of 2 million TEUs, increasing KCT’s overall capacity to 5.2 million TEUs. In 2012, the Port Authority announced that it has signed an MOU with China Harbor Engineering to undertake this project; no further update followed up since then, however. As seen in Figure 4-12, the new terminal requires massive reclamation, hence the high cost of construction noted above – $900 million for 2 post-Panamax berths. The Fort Augusta plan
shown in Figure 4-12 can be expanded if necessary, eventually connecting the new terminal to the existing terminal in Gordon Cave. The Fort Augusta plan is part of a wider plan, which also includes the development of a new “economic zone” of logistics hub in the nearby Caymans connected with a direct road to Kingston.

**Figure 4-13 Kingston's Expansion Plan**

The objective of Kingston ambitious plan is “The development of the hub will position Jamaica as a major logistics point that will be able to benefit from increased trade activities through the Caribbean as a result of the expansion of the Panama Canal. When achieved, it will position Jamaica to become the fourth node in the global logistics chain ... along with Singapore, Dubai and Rotterdam”. It seems that the Jamaican Government expects that the expansion will be a “game changer” in terms of trade and economic activity. The massive increase in transshipment traffic that can justify the Fort Augusta plan could only be generated by transformation of the AWP service pattern and the related feeding of ECNA and GCNA as discussed in Section 3.1.

---

16 JIS, January 13, 2014.
**Caucedo, Dominican Republic**

**General**

Caucedo is a private container terminal operated by Dubai Port World (DPW). The terminal is located 25 km east of Santo Domingo, nearby the international airport and adjacent to a large Free Trade Zone. It is a modern, well-planned terminal, which began operations in December 2003.

In the Santo Domingo area, along 50 km of shore line, there are 4 container ports: Boca Chica, Caucedo, St. Domingo, and, Rio Haina (see below).

**Present Port Facilities and Expansion Plans**

*Figure 4-14* shows an aerial map of the terminal. As seen there, the present facilities consist of 2 docks:

- **Main Dock** – 622-m berth equipped with 6 super-post-Panamax cranes, the latest of which can reach 22-wide ships. Depth alongside is 13.5 m. The main dock has a 50-ha backup yard, served by 23 RTGs with 6,000+ ground slots. An additional yard, marked in yellow, has 30 ha mainly used for empty boxes.

- **Breakwater Dock** – a 300-m berth located along the breakwater served by 2 MHCs.

Expansion plans include extension of the main dock (shown in orange), adding a 300 m dock and resulting in a total berthage of 900 m. The depth alongside the new extension will be 16 m, sufficient for handling Post II ships. Although no official plans have been drawn yet, a second 300-m extension can be developed, bringing the total berth length to 1,200 m. There is also a possibility of extending the breakwater dock. Finally, although no plans have drawn yet, while visiting with the port in 2011, we were presented with a conceptual plan of a major reclamation at the end of the breakwater.

*Figure 4-14 Caucedo Present and Future Facilities*
**Operations and Productivity**

Figure 4-14 shows a chart of the Port productivity given to us during a 2011 visit. As seen there, crane productivity has reached 30 moves/hour and berth productivity 60 moves/hour. No wonder that DPW titled this chart “best productivity in the Caribbean.” JOC Port Productivity 2012 listed Caucedo with berth productivity of 41 moves/hour.\(^{17}\)

**Figure 4-15 Caucedo’s Crane and Berth Productivity**

![Chart showing Port productivity](image)

**Traffic**

The latest traffic statistics for 2012 includes 1.15 million TEUs, a 15% increase over the 993,000 TEUs recorded in 2011 and 1.0 million TEUs in 2010. Part of the growth seems to stem from a shift of traffic from Rio Haina.

Caucedo’s traffic composition is equally divided between transshipment and domestic. The main lines calling Caucedo include MSC, Hapag Lloyd, CMA-CGM, CSAV, Hamburg Sud, and Maersk. MSC is the largest customer of Caucedo. Interestingly, MSC also is the main user of Freeport. Maersk is only calling Caucedo by a feeder service from its MIT hub. The main services of Caucedo are the ECSA/ECNA, including Parana with 6,500-TEU ships (see Section 3.3), ECSA/GCNA and WCSA/Europe, including the Eurosal’s Sling 1. Accordingly, Caucedo serves as a hub mainly to ECSA and Europe trades with the Caribbean.

Rio Haina is located about 50 km to the west of Caucedo. It is a river port with several short, 200-m berths and depth alongside of 10 m. The port handled 380,000 TEUs in 2012, mostly of Florida/Caribbean Specialists.

---

\(^{17}\) JOC Port Productivity ranking is based on shipping lines reports and it is an average of all ship and call size.
Capacity
The main dock is estimated by DPW to have capacity of 1.0 million TEUs; the breakwater 250,000 TEUs. Hence the total capacity of the present facilities is 1.25 million TEUs. We agree with their estimate.

Based on our Berth Indicators, the 600-m berth extension of the main dock will add about 1.1 million TEUs of capacity, bringing the total to 2.35 million TEUs. Unlike Fort Augusta, the extension of the main dock does not require major reclamation. Likewise, both the existing and the new berth can share STS cranes and yard equipment. Another advantage is that Caucedo’s channel is relatively short. However, there may a need to extend the breakwater. Altogether, it seems that providing additional capacity in Caucedo could cost a fraction of that in Kingston.

Panama Ports Company (PCC), Panama

General
The terminal is located at the site of the historical Cristobal Port, adjacent to the entrance to the Canal. The concession to operate Cristobal and Balboa was granted in 1997 to Hutchison Port Holding (HPH), the second largest port operator worldwide.

Present Port Facilities and Expansion Plan
Figure 4-16 shows an aerial photo of the northern dock, the only part of PCC currently in operations. As seen in the figure, HPH retained the original, finger-pier layout, a remnant from the pre-containerization era. The present terminal has 3 berths equipped with 11 STS cranes and 16 ha yard equipped with 36 RTGs. Depth alongside ranges 12 – 16 m.

The present terminal utilizes a small portion of the 140 ha under concession. There are several expansion plans, including new terminals on the east and south side (not shown in Figure). Another option is to fill the water areas between the finger piers and create a large terminal. Figure 4-17 shows one of the expansion plans.
Traffic
CCT handled 850,000 TEUs in 2012, a decline of about 15% from the 980,000 TEUs handled in 2011. It is understood that the main user of this terminal is MSC with its AWP services.

Capacity
The estimated capacity according to CCT website is 1.5 million TEUs. The terminal has several expansion options, one of them shown in Figure 4-24. If all expansion options are fully exploited the terminal could have 7 Post II berths with total capacity of about 4 million TEUs.
**Cartagena, Colombia**

**General**
The Port of Cartagena main container terminals are operated by Sociedad Portuaria Regional de Cartagena (SPRC). SPRC is a private company which operates 2 container terminals in Cartagena Bay, Magna and Contecar, along with distribution centers, and other maritime-related businesses. SPRC was created by a group of local business people who, in 1993, won a 40-year concession from the National Port Authority to operate the Magna Terminal, an old, general-cargo facility with a finger pier. In 2005, SPRC purchased its second terminal, Contecar, locate about 10 km from Manga. Since then, SPRC has invested $272 million in Magna and in Contecar.

SPRC has 1,100 direct employees, all non-union.

There is another small private container terminal in Cartagena Bay, Muelles el Bosque, adjacent to Manga (see below).

**Present Port Facilities and Expansion Plans**
Cartagena Bay is a large harbor, fully protected from the sea, with 18+m of natural depth. The main container terminals in the harbor include:

- **Manga Terminal** – Manga has a marginal berth of about 540 m with depth alongside of 13.1 m, equipped with 7 STS cranes, and a finger pier of about 200 m on each side, with depth alongside of about 10 m, equipped with 5 MHC. There are plans to further extend the berth to 700 m. The total terminal area is 45 ha. Manga also has a cruise terminal.

- **Contecar Terminal** – Contecar, located about 20 km (by land) to the west of Manga, is a large terminal, with a marginal berth of 970 m, of which 700 m are operational and 44 ha of waterfront land. The depth alongside is 16.5 m. When fully developed, it will have 12 STS cranes, 60 RTGs and 14 Empty Handlers. The total terminal area is 86 ha. The total investment to fully develop this terminal is estimated at $650 million.

El Bosque has 330-m berth with depth alongside of 10.7 m equipped with a single old-model STS and 2 MHCs. The total terminal is 22 ha, but only one third of it used for containers.

**Figure 4-18** shows the full build-out layout of Contecar. As seen in this figure, the terminal is designed to handle 3 Post II ships, with each served by 4 STS cranes. In addition, the terminal has large CFS and storage facilities. It is also interesting to note the large gate complex in the terminal layout; apparently, Contecar is designed to handle a substantial volume of domestic traffic.
The original plan was to complete the development of Contecar in 2016. However, in an interview with SPRC managers they divulged that sensing a future weakening in demand, despite the pending expansion of the Canal, they decided to slowdown investments in Contecar for the time being. Apparently, they also do not expect a “game change” following the Canal expansion.

**Operations and Productivity**

Figure 4-19 shows a chart of the berth productivity of Cartagena’s main terminals during 2013. As seen in this figure the berth productivity of main services, defined as those handling more than 750 moves averaged around 80 moves/berth-hour and that for feeder services around half of it. Manga and Contecar terminals have twin-lift cranes and highly sophisticated terminal operating systems.
Traffic
SPRC’s traffic composition is almost equally divided between domestic and transshipment. The combination of large domestic cargo base and the near-Panama location (272 NM) is the main reason underlying Cartagena’s development as a major transshipment hub. The Cartagena area has 6 million inhabitants and it is the largest export zone of Colombia. The transshipment consists of feeding mainly to nearby Colombian ports, Barranquilla and Santa Marta and to Venezuela’s main ports, Puerto Cabello and La Guaira.

Cartagena handled 2.2 million TEUs in 2012, almost 20% more than the 1.85 million TEUs in 2011. Figure 4-20 illustrates the rapid development of the traffic in Cartagena since 2005.
The Port is presently called by 8 mainlines and 4 feeders and serves a hub port, Hamburg Sud, for CMA-CGM, Hapag Lloyd, CSAV and others. The main POS line, the Asia/Caribbean Specialist PEX2 by CMA-CGM/CSAV/CSCL, calls at Cartagena as the first port after crossing the Canal, turning Cartagena into main distribution hub for Asian imports. Other notable services are the WCSA/Europe, 2 Eurosal Sling, provided jointly by CMA-CGM/Hamburg Sud/Hapag Lloyd; and ECSA/Caribbean Specialist BRASEX of CMA-CGM, which also calls at POS and NCSA/GCNA Gulf Bridge Express. Cartagena’s transshipment is a mixture of hub & spoke and relay.

**Capacity**

The capacity of Manga Terminal is estimated at 1.7 million TEUs and that of Contecar at 3.2 million TEUs when completed. Accordingly, the full-build total capacity is 4.9 million TEUs. Current capacity of both terminals is estimated at 2.5 million TEUs. We believe that a more realistic capacity estimates are 1.5 million TEUs for Manga and 2.5 million TEUs for Contecar or a total of 4 million TEUs.

**Freeport, Bahamas**

**General**

The port is the closest Caribbean port to the US, located about 105 km from Palm Beach, and 170 km from Miami Florida. The artificially-dug harbor includes Freeport Container Port (FCP), a major transshipment terminal, a small domestic terminal and a cruise terminal. It is owned by Hutchison Port Holding (HPH), a major Hong-Kong based port operator with total handling

---

18 According to Cartagena’s berthing plan PEX2 was replaced by PEX3, an Asia/GCNA service also provided by 5,000-TEU ships.
of 75 million TEUs (2011). Among others, HPH also is the operator of major terminals in Balboa and Cristobal, Panama.

FCP is part of the Grand Bahamas Port Authority Limited, (GBPA), a private corporation that acts as a municipal authority for the 526 sq km of “Port Area”, including the City of Freeport, an international airport and a Free Trade Zone. GBPA was established in 1955, the result of an agreement of the Government of The Bahamas with a group of American and British investors. The agreement required the dredging of a deep-water harbor at Hawksbill Creek in the western sector of the Port Area. FCP commenced operations in 1997 with investment, by HPH, of $78 million. Since then, HPH has invested about $1 billion in port and non-port development projects in Freeport. The Port was originally planned to become a pure transshipment hub, since there is almost no domestic cargo in Freeport where the entire population is only 52,000 people.

HPH’s 99-year agreement, ending in 2054, also conveys to the area a status of a “free port” with substantial tax concessions for financial, commercial and industrial enterprises, including:

- Exemption from Customs duties for the importation of goods into the Port Area other than for personal use;
- Exemption from personal property taxes or rates, capital levies or gains taxes and real property (land) taxes until 2015; and
- Exemption from income taxes, excise taxes, certain export taxes and stamp duties on certain transactions.

According to recent publications, Mediterranean Shipping Line (MSC) has become a major shareholder of FCP and recently, following a dwindling profitability, has increased its ownership share. A recent initiative undertaken by HPH intends to promote a 300-ha “sea-air” logistics hub, taking advantage of the adjacency of the marine and air ports. Freeport has plenty of undeveloped area around the port as can be seen in Figure below.

**Present Port Facilities and Expansion Plan**

*Figure 4-21* shows a picture of the present FCP facilities. The main facilities include 1,036-m of berthage with depth alongside of 15.5 m and 49 ha of terminal area. The berth is served by 10 STS cranes and 2 MHCs. The yard is served by 75 Strads and 3 Empty Handlers. The access channel and turning basin have depth of 16 m.

Freeport was constructed according to a 7-phase development plan, the first 4 of which already completed. The next Phase V includes 350-m berth and yard area, at a cost of $250 million. This is a much lower cost than that quoted for Fort Augusta. Upon completion of Phase V, FCP will have total quay length of 1,536 m, a yard area of 63 hectares, a depth alongside of 15.5 m and 16 super-post-Panamax quay cranes. *Figure 4-22* shows FCP facilities upon completion of Phase VII, or at the full-build-out stage, with 2,749 m of berthage, including a side berth. Longer-term, the plan is to further extend the berthage to 3,848 m.
Traffic

FCP throughput in 2012 was 1.2 million TEUs, a slight increase from the 1.1 million TEUs handled in 2011. It is understood that most of the traffic is by MSC. MSC uses it as a hub to feeder ECNA, GCNA and the Caribbean.

Operations and Productivity

FCP is a “pure transshipment port” (PTP) with almost no domestic cargo. Freeport is the only Caribbean hub already handling Post II ships deployed on both the Parana and MSC Golden Gate services. The latter is an AWS, which employs the 9,200-TEU MSC Bruxelles, the largest ship currently calling ECNA.

No statistics on productivity is available. However, Freeport boasts in its advertisement that crane productivity exceeds 30 moves/hour.
**Capacity**

According to HPH, the current terminal, with about 1,000-m berth, has capacity of 1.5 million TEUs, which is in line with our Berth Indicators. The full-build-out plan, with 2,750-m berthage, will have capacity of 3.5 million TEUs.

Longer development plans, indicated in Caribbean Maritime Magazine (May 2013) call for expanding the terminal to 3,848 m berthage and respective capacity of 6.7 million TEUs.

**Manzanillo International Terminal (MIT), Panama**

**General**

MIT is a private Terminal jointly owned by SSA and two Panamanian families. It is located near the Atlantic (north) entrance of Panama Canal. The terminal began operations in 1995. It was originally designed to mainly handle transshipment traffic\(^{19}\), complementing the public Port of Cristobal that mainly handles domestic traffic. The terminal is adjacent to the Colon Free Zone, and connected to it via a special gate. MIT also is located nearby an intermodal rail yard, serving the double-stack rail service for containers between Colon and Balboa.

**Present Port Facilities and Expansion Plan**

**Figure 4-23** shows an aerial photo of MIT’s present facilities. The warehouses south (right in the photo) of MIT are the Colon Free Zone; the terminal north of MIT (left in the photo) is CCT (see below). **Figure 4-24** shows an aerial photo of MIT’s existing terminal along with the future expansion on its northern side, with the 4 STS cranes in light blue. The present terminal includes a long 1,240-m marginal berth and a 400-m the side berth. The depth alongside is 14 m, which also is the depth of the access channel. MIT has its own access channel through a special, 200-m opening through the breakwater protecting the basin at the Atlantic side entrance of Panama Canal. The terminal area is 52 ha, but the total area controlled by MIT is 160 ha. MIT uses the area as a logistic park.

\(^{19}\) Members of this study team conducted the initial market study on transshipment potentials.
The main equipment includes 16 STS cranes, 9 of which super-post-Panamax, and 27 RTGs, all 1-over-6. The terminal has been recently experimenting with remote driving of STS cranes, the first such experiment to be conducted worldwide. MIT is also considering conversion of the yard system from RTGs to automated Rail-Mounted-Gantry cranes.
Future expansion plans, as seen in Figure 4-21 include the construction of a new north dock of about 700 m and a west dock of about 200 m (our estimate) with 16.5 m depth alongside. No details are available yet about this terminal although it is understood that the north dock is designed for handling NPX ships.

**Traffic**
MIT handled 2.06 million TEUs in 2012, about 8% higher than the 1.9 million TEUs handled in 2011. However, in our interview with MIT’s management, we learnt that the traffic declined in 2013, amounting to 2.05 million TEUs and may continue to decline in 2014. The reasons given for the decline are: (a) the shift of Asian lines to the Suez route or the conversion of AWP to AWS (see discussion in Section 3.1); and (b) economic problems in Venezuela. Venezuela is responsible for about 20% of MIT traffic. The traffic composition of MIT consists of 85% transshipment and 15% domestic. Most of the domestic traffic is destined to the Free Trade Zone, located adjacent to the terminal and connected to it via a special gate. About 25% of the traffic is rail-bound due to the Canal’s constraints. This traffic may disappear once the Canal is expanded.

MIT serves as a Caribbean hub for most of the G6 and CKYH member lines. These lines stop at MIT with their AWP services and use the terminal to distribute Asian imports to the Caribbean Region. Maersk, the larger user of MIT in the past, has currently no AWP service. Maersk’s main Transpacific services, employing post-Panamax ships, only stop at Balboa on the Pacific side and rail their containers to MIT on the Atlantic side. Maersk still calls at MIT with other mainline services, including those to ECNA, GCNA and Europe along with several feeders, one of them also calls at Point Lisas.

**Operations and Productivity**
No data is available, but in our interviews we were told that while handling 5,000-TEU ships, with about 1,500 moves, STS cranes average around 30 moves/hour. Typically, the terminal assigns 4 cranes for working such ships, resulting in 120 moves/berth-hour. Total time at berth, including preparation before and after work, is about 14 hours.

**Capacity**
The capacity of the present terminal is estimated at 2.4 million TEUs. We estimate the capacity of the expansion shown in Figure 4-21 at 1.2 million TEUs, based on our Berth Indicators: 0.5 million TEUs for each of the Post II berths and 0.2 million TEUs for the feeder berth. Accordingly, the expanded terminal will have capacity of 3.6 million TEUs. MIT’s estimate of the expanded terminal’s capacity is higher at 4 million TEUs.

**Colon Container Terminal (CCT), Panama**

**General**
CCT, like MIT, is a private terminal operated by Evergreen Group, a group of companies that also includes Evergreen Line, the fourth largest shipping line worldwide (Figure 3-5). The concession was granted in 1996 and the terminal began operations in 1997 after initial investment of $110 million.
Present Facilities and Expansion Plans

Figure 4-25 shows an aerial photo of CCT. The terminal began operation with about 400-m dock on its south side (right side of the picture) with depth of 14 m alongside. The dock was extended in 2003 to 660 m. In 2008, CCT added the western dock with 320 m length and 15 m depth, along with its adjacent area. Presently the total berth length is 980 m. The main equipment includes 10 STS crane, 5 of which post-Panamax and 30, 1-over-6 RTGs. The total yard area is 28 ha.

CCT has not published expansion plans. However, a sketch provided on its website indicates possible extension of the west dock and development of a north dock. There is sufficient yard area to support these extensions since the terminal only uses a fraction of the total 74 ha site. It is reasonable to assume that the expansion will be designed for handling NPX. It should be noted that.

Figure 4-25 Colon Container Terminal

Traffic

The terminal handled 609,000 TEUs in 2012, an increase of 24% from the 490,000 TEUs handled in 2011. The terminal serves mainly Evergreen Lines and AWP services of the CKYH alliance, along with their feeders. As noted in Section 3.1, Evergreen is closely affiliated with this alliance, including several joint services. Traffic composition in 2012 included 69% transshipment and 41% domestic, most of it to/from the Free Trade Zone.

Operations and Productivity

The terminal did not provide us with productivity data. The JOC ranked the terminal as a “top terminal” with berth productivity of 51 moves/hour. It is interesting to observe in Figure 4-22 that the ship berthed at the western dock (bottom of picture) is served by 4 STS cranes. Likewise, the Evergreen ship at Figure 4-21 is served by 6 STS cranes.
**Capacity**

The capacity of CCT’s present facilities is estimated by its management at 1.3 million TEUs, more than twice its traffic of 609,000 TEUs. An additional NPX berth added to the Western Dock could result in additional 0.6 million TEUs of capacity. The north side, if ever developed, could include 2 NPX berths, adding 1.1 million TEUS of capacity. Accordingly, at full build out phase, the terminal could have capacity of 3 million TEUs.

**Panama Colon Container Port (PCCP), Panama**

*Figure 4-26* shows a rendering of the proposed terminal on Margarita Island. As seen in this figure, the terminal will be located across from PCC with its back to the breakwater. According to a study by the developer, Jones Lang LaSalle, the terminal will consist of a 1,050 m marginal dock with depth alongside of 16 m, 40 ha of terminal area, 12 STS cranes, 35 RTGs and 11 Empty Handlers. The planned capacity is 2 million TEUs. The cost of construction is estimated at $900 million. The relatively-high cost reflects the need for major reclamation. PCCP is connected to an adjacent 27 ha that could be developed as port-side logistic park similar to MIT’s.

The original plan was to open this terminal to coincide with the opening of the expanded Canal in 2014. The latest news available about this project is that the Government of Panama signed a contract with unspecified Chinese investors to invest $594 million in the terminal. The Government will be paid $12/TEU, which is similar to the rate charged at other Panama terminals.20

*Figure 4-26 Margarita Island Terminal*

---

20 The $12/TEU or about $18/box is quite high considering that the terminal overall charge for transshipment box is currently at $60-70/box.
Moin, Costa Rica

APM Terminals (APMT), a sister company of Maersk, won a 33-year concession and the exclusive right to handle containers in the Limon/Moin area. The new terminal is built on reclaimed land, about 500-m from the shore line and includes a major breakwater. APMT is also obligated to dredge and maintain the access channel and turning basin for the entire port complex along with an access road. Figure 4-26 shows a rendering of the final phase of the terminal. The new terminal will be developed in two phases:

- Initial Phase – 600 m berth with depth alongside of 14.5 m and 16 m at the access channel, with 40 ha of yard area; and
- Final Phase – 1,500 m berth with depth alongside of 16 m and 18 m at the access channel, with 80 ha of yard area.

The 18-m access channel is needed to accommodate large tankers.

Construction of this terminal has already begun with the first 600-m section expected to begin operations in 2017. The cost estimate is high, at $1 billion, because of the large reclamation and the need to construct a 1.5-km of breakwater. The capacity of this phase is about 1.3 million TEU vs. current throughput of nearly 1 million TEUs. The capacity of the final phase is 2.7 million TEUS.

APMT contract with the Government of Costa Rica only allows APMT to handle domestic cargo; transshipment is forbidden. The transshipment traffic is targeted by another group, America's Gateway Development Corporation (AMEGA), which is proposing the construction of a “pure transshipment port” (PTP) at a different site in the Moin area. AMEGA’s terminal will be constructed on reclaimed land, will need a breakwater and expected to cost $1.1 billion. Its planned capacity is 2 million TEUs. AMEGA, much like Cartagena, will try to take advantage of its Near-Canal (160 NM) location. However, unlike Cartagena, AMEGA will not have domestic cargo and will have to solely rely on transshipment (PTP).

Mariel, Cuba

The new container terminal in Mariel, located in a small city 45 km west of Havana, has been recently inaugurated (January 2014). The development of this terminal was the result of a recent change in Cuba’s law to allow foreign private investments. Accordingly, the terminal was constructed by Grupo Odebrecht, a large Brazilian consortium, which is also involved in the construction and ownership of Embraport, a large container terminal in Santos, Brazil. The construction of Mariel is financed by a $680 million loan of the government of Brazil given through its development bank (BNDES).

---

21 Nathan Inc., served as advisor to the Government of Costa Rica in its negotiation with APMT. Prior to it, Nathan also advised AMEGA during its pre-feasibility study.

22 Nathan advised Odebrecht in the development of Embraport.
The first phase of new port will include a 700-m terminal, with 15-m channel, with capacity of 1 million TEUs. The port is part of a larger $900-million, 466 sq km project of a “special development zone”. Singapore’s PSA International won the bid to operate the terminal, but will not invest in its development. PSA is also one of the three pre-qualified bidders on Kingston’s KCT, perceived as the main competitor of Mariel.

The Port of Mariel is intended to replace the Port of Havana. Havana’s present terminal has capacity of 350,000 TEUs; its 2012 throughput was only 240,000 TEUs, a slight decline from 245,000 TEUs handled in 2011. Since the capacity of the new terminal is 1 million TEUs, most of the capacity will be utilized for handling transshipment traffic.

Mariel is located less than 300 NM from Miami. According to the Port Authority’s statement, the new terminal is designed to cater to the new wave of activities triggered by the Panama Canal expansion, especially serving as a transshipment hub similar to that of the neighboring Kingston. The Cuban terminal is unlikely to serve as transshipment hub for the US due to the 51-year trade embargo. Another obstacle to Mariel’s aspiration as a hub is that ships calling Cuba are not allowed to call in the US for 2 years.

### Ponce, Puerto Rico

The Port of the Americas is a new container terminal located in Ponce, on the southern coast of Puerto Rico. In 2002, the government of the Commonwealth of Puerto Rico initiated an ambitious plan to develop a PTP there with capacity of 2.2 million TEUs, at a cost of $750 million. The initial phase of this plan has already been completed, including a 365-m dock and two modern gantry cranes. Nevertheless, the terminal is reportedly only handling a limited volume of containers.

Puerto Rico is part of the US and therefore high cost: (a) all shipping services between US territories have to be provided by US-flag ships, which are 2 – 3 times more expensive than foreign-flag ships; and (b) labor cost in Puerto Rico is high. Ponce also is the most remote Caribbean port from the US. Hence, it is unlikely that Ponce will play a major role in transshipping US-related trade.

### Pointe-à-Pitre, Guadeloupe

Guadeloupe is one of four territories that comprise the French West Indies, which also includes Martinique. The present terminal has about 350-m of berth with limited depth alongside.

The port’s 2012 traffic includes 212,000 TEUs of which 80,000 TEUs transshipment, a large increase from the 132,000 TEUs and 33,000 TEUs respectively handled in 2011. Guadeloupe is part of France and therefore a preferred port for the French line CMA-CGM, the major customer of T&T ports. Indeed, CMA-CGM has a direct service to Guadeloupe and Martinique from France, operated by 2,260-TEU ships.
The Port Authority of Guadeloupe has declared an ambition to position itself by 2015 as the Lesser Antilles’ hub for containerized transport. To achieve it the Authority developed an expansion plan.

Phase I of the plan includes a 350-m berth, with 15 m depth alongside and 25 ha platform serving as a container yard, with the capacity of 540,000 TEUs. Further developments, based on the result of a 2009 study, include an additional 350-m berth and 15 ha. At this point the terminal will have a total of 1,300 m of berth, 52 ha of yard and capacity of 1 million TEUs. Depth alongside could be dredged to 16 m. Figure 4-27 shows a rendering of the existing (right side) and proposed new terminal.

**Figure 4-27 Guadeloupe Container Terminal Expansion Plan**

We understood during our interview that the prospects of Pointe-à-Pitre to become a major transshipment hub are slim due to the high cost and difficult labor situation in French territories. However, the improvement of the port may attract more direct calls at the expense of transshipment in nearby hubs, among them T&T ports.

**Puerto Cabello, Venezuela**

There is no much data available on the present port facilities. Our interviews with lines indicated that current port facilities are old and inadequate and the performance is bad.

The current port is located in a natural harbor with no expansion possibilities. A new, ambitious plan was drawn in 2010 to take advantage of a nearby, close to shore island, using it as a base for a breakwater allowing the developing of a new port and a large industrial area.

**Figure 4-28** shows the 3-phase development plan. Phase I includes a 2-berth, 690-m terminal, with depth alongside of 16 m and capacity of 700,000 TEUs. Originally, it was scheduled to be completed by 2013. More recent news indicates that the completion is scheduled for 2015-16. The original investment for this phase was $520 million, but higher
figures have been mentioned recently. We already mentioned that the project will be handled by China Harbor Engineering.

**Figure 4-28 Puerto Cabello Expansion Plan**

Puerto Cabello which handled 846,000 TEUs in 2012 has sufficient domestic cargo to justify the new project if the Port Authority decides to close some of the present facilities. It is interesting to note, however, that like almost all the Caribbean ports reviewed thus far, the port’s aspiration for this expansion project is to become a major transshipment hub. Based on existing performance and political circumstances, it is doubtful that this goal is achievable in the foreseeable future.

### 4.4. Summary of Caribbean Hub Ports Capacity vs. Throughput

**Present and Future Capacity**

*Figure 4-29* presents a summary table of all the major Caribbean Hub Ports, arranged by terminals and includes, for each terminal, the main particulars of its present facilities, expansion projects, the capacity estimates of both, 2012 total traffic and estimated transshipment portion of it. The figure includes only the relevant ports or those that could present competition to T&T ports; it excludes minor ports and port projects not expected to be realized in the near future. As seen in this figure, the present capacity of the relevant ports is 12.23 million TEUS, about 31% than their present traffic of 9.39 million TEUs. This level of overcapacity is common in the port industry; it definitely does not indicate any shortage of capacity. As seen in the previous sections, none of the ports and terminals listed in this figure has shortage of capacity although some of them, notably Kingston and POS, require upgrade and addition of equipment.

The future situation is markedly different. The planned capacity expansion projects will add 14.95 million TEUs of capacity, 122% of the existing one. Accordingly, if all projects listed by
the various ports are realized within 3-5 years, their capacity will be 261% of present throughput. We do not expect, however, that all the expansion projects listed in this figure and described in the preceding sections will be realized. Nevertheless, serious overcapacity situation is expected in the future.

**Transshipment Traffic**

As seen in the last column of Figure 4-29, the total Caribbean market for transshipment is 5.99 million TEUs, or 64% of the traffic of the Caribbean ports included in this figure. The largest concentration of transshipment traffic is in Panama/Atlantic, 2.90 million TEUs, or 48% of the total Caribbean. Kingston is in the second place with 1.19 million TEUs followed by Cartagena with 1.10 million TEUs. Based on our recent interviews, it seems that Cartagena is likely to overtake Kingston when Contecar is fully developed. T&T, with transshipment of about 0.23 million TEUs, accounts for only 4% of the total Caribbean transshipment traffic.

**Figure 4-29 Caribbean Ports' Facilities, Expansion and Traffic**

<table>
<thead>
<tr>
<th>Location</th>
<th>Terminal Description</th>
<th>Depth Channel</th>
<th>Deck</th>
<th>STS</th>
<th>MHC</th>
<th>CY</th>
<th>Total Berthage (m)</th>
<th>Post II</th>
<th>Cap (M TEUs)</th>
<th>Traffic (M TEUs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>T&amp;T</td>
<td>PPOS</td>
<td>Present</td>
<td>12.0</td>
<td>12.0</td>
<td>500</td>
<td>200</td>
<td>30</td>
<td>50</td>
<td></td>
<td>0.40</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>STS/RTG, Dry Berth</td>
<td>16.0</td>
<td>16.0</td>
<td>800</td>
<td></td>
<td></td>
<td></td>
<td>0.20</td>
</tr>
<tr>
<td>Kingston</td>
<td>KCT</td>
<td>Present</td>
<td>13.0</td>
<td>13.0</td>
<td>2,310</td>
<td></td>
<td></td>
<td></td>
<td>1.50</td>
<td>1.44</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Pave Yard</td>
<td>294</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2.70</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Port Augusta</td>
<td>16.0</td>
<td>16.0</td>
<td>1,000</td>
<td></td>
<td></td>
<td></td>
<td>0.60</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>T&amp;W</td>
<td>Present</td>
<td>1,600</td>
<td>25</td>
<td></td>
<td></td>
<td>0.50</td>
<td>0.28</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cartagena</td>
<td>Magna</td>
<td>Present</td>
<td>11.0</td>
<td>11.0</td>
<td>330</td>
<td></td>
<td></td>
<td></td>
<td>0.12</td>
<td>0.12</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Eastern Berth</td>
<td>250</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.30</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Caução</td>
<td>Present</td>
<td>13.0</td>
<td>13.5</td>
<td>620</td>
<td>300</td>
<td>50</td>
<td>80</td>
<td></td>
<td>1.25</td>
<td>1.15</td>
</tr>
<tr>
<td></td>
<td>1st Ext.</td>
<td>16.0</td>
<td>16.0</td>
<td>300</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.50</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2nd Ext. + BW</td>
<td>16.0</td>
<td>16.0</td>
<td>300</td>
<td>300</td>
<td></td>
<td></td>
<td></td>
<td>0.30</td>
<td></td>
</tr>
<tr>
<td>Rio Nama</td>
<td>Present</td>
<td>10.0</td>
<td>10.0</td>
<td>300</td>
<td>200</td>
<td></td>
<td></td>
<td></td>
<td>0.38</td>
<td>0.38</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Panama</td>
<td>MIT</td>
<td>Present</td>
<td>14.0</td>
<td>14.0</td>
<td>1,640</td>
<td>52</td>
<td>160</td>
<td></td>
<td>2.40</td>
<td>2.40</td>
</tr>
<tr>
<td></td>
<td>North Expansion</td>
<td>16.5</td>
<td>16.5</td>
<td>500</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1.20</td>
<td>1.06</td>
</tr>
<tr>
<td></td>
<td>Add Berth</td>
<td>16.5</td>
<td>16.5</td>
<td>350</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.55</td>
<td>0.55</td>
</tr>
<tr>
<td></td>
<td>South Expansion</td>
<td>16.5</td>
<td>16.5</td>
<td>140</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.55</td>
<td>0.55</td>
</tr>
<tr>
<td></td>
<td>PPCP</td>
<td>Construct</td>
<td>16.0</td>
<td>16.0</td>
<td>1,050</td>
<td>40</td>
<td>67</td>
<td>50</td>
<td>0.50</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Freeport</td>
<td>Present</td>
<td>15.5</td>
<td>15.5</td>
<td>1,036</td>
<td>45</td>
<td></td>
<td></td>
<td></td>
<td>1.20</td>
<td>1.20</td>
</tr>
<tr>
<td></td>
<td>Phase V</td>
<td>355</td>
<td>355</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.50</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Phase VII</td>
<td>1,363</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1.20</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total Caribbean Region Main Ports</td>
<td></td>
<td>12.27</td>
<td>14.95</td>
<td>24.22</td>
<td>9.39</td>
<td>64%</td>
<td>1.99</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
5. Ship Size Evolution and Implications for T&T

5.1. Evolution in Ship Size

Increase in Ship Size

The continuous increase in ship size has been a distinct characteristic of containerization. The first containership, the Ideal X, a converted tanker with capacity for 58 35-ft boxes, was introduced by SeaLand in 1956. The largest ships currently in operation are the Triple-E class of ships with capacity of 18,000 TEUs. Interestingly, the owner of the 18,000-TEU ships, Maersk Line, bought SeaLand in 1999. Recently, Maersk announced the launching of a new subsidiary, naming it SeaLand (see Section 3.3).

Because of the importance of Panama Canal for containerized trade in the early days of containerization, containerships are often categorized according to their relationship to the Canal’s locks. Figure 5-1 shows a table of the main dimension of various generations of containerships, starting with Panamax. Panamax ships are defined as the largest ships that can fit into the existing locks of Panama Canal. New Panamax (NPX) ships are defined as the largest ships that will be able to fit into the new locks of Panama Canal once it becomes in late 2015. Our analysis focuses on the transition from Panamax to NPX. However, the figure, taken from a study by members of this team on future trends in liner shipping, also presents the larger than NPX ships, including the largest ships the future, the Malacca-Max. As seen in the figure, the size of this ship is 2.2 time NPX, similar to the ratio between NPX and Panamax.

Figure 5-1 Ship-Size Categorization

<table>
<thead>
<tr>
<th>Category</th>
<th>Name</th>
<th>TEUs</th>
<th>DWT</th>
<th>LOA x Beam X Drat</th>
<th>Under-Below-Across</th>
</tr>
</thead>
<tbody>
<tr>
<td>Panamax</td>
<td>Zim Savannah</td>
<td>5,000</td>
<td>67,000</td>
<td>295 x 32.3 x 13.5</td>
<td>8-6-13</td>
</tr>
<tr>
<td>Post I</td>
<td>HSD Rio Negro</td>
<td>5,900</td>
<td>74,000</td>
<td>285 x 40 x 13.5</td>
<td>9-5-15</td>
</tr>
<tr>
<td>Post II</td>
<td>Sovereign Maersk</td>
<td>8,000</td>
<td>105,000</td>
<td>347 x 42.8 x 14.5</td>
<td>9-6-18</td>
</tr>
<tr>
<td>Post III</td>
<td>New Panamax</td>
<td>12,500</td>
<td>150,000</td>
<td>366 x 49 x 15.2</td>
<td>10-6-19/20</td>
</tr>
<tr>
<td>Post III</td>
<td>Emma Maersk</td>
<td>15,000</td>
<td>175,000</td>
<td>397 x 56.4 x 16</td>
<td>10-8-22</td>
</tr>
<tr>
<td>Post III</td>
<td>Triple E</td>
<td>18,270</td>
<td>200,000</td>
<td>400 x 59 x 16</td>
<td>10-8-23</td>
</tr>
<tr>
<td>Post III</td>
<td>Malacca-Max</td>
<td>28,000</td>
<td>300,000</td>
<td>400 x 63 x 21</td>
<td>12-9-25</td>
</tr>
</tbody>
</table>

Ashar 2013
The most constraining dimensions for ships transiting the Panama Canal are the width and depth of Panama’s locks. Figure 5-1 shows the capacity of Panamax as 5,000 TEUs, which is the size of the latest design (the nominal capacity can reach even 5,100 TEUs). However, most Panamax ships in operations are older and their capacities are considerably smaller at 4,200 – 4,500 TEUs. Hence, the 5,000-TEU ships are often defined as “full” Panamax. Also, there is a difference between the capacity of NPX in this figure, 12,500 TEUs and the 13,000 TEUs mentioned in the previous chapter. The difference reflects the uncertainty regarding the future operations of Panama’s new locks. The most recent design of NPX by Hyundai and Samsung shipyards, prepared for Hapag Lloyd and OOCL is for 13,200-TEU ships (366.4 x 48.2 x 15.5 m, 142,000 dwt). Figure 5-2 shows the Samsung’s design of NPX.

Figure 5-2 New Panamax (NPX) Design

It could well be that once more experience has been accumulated in operating the new locks, larger-capacity ships will be allowed to transit reaching 14,000 TEUs or even beyond that. It should also be noticed that the draft of the Panamax in Figure 3-1 is 13.5 m while that in Figure 3-6 is only 12.04 m, suggesting that Panamax ships have to be light-loaded (partially loaded) when transiting the Canal. These ships discharge part of their boxes in Balboa on the Pacific side of the Canal to reduce their draft, with some of these boxes railed to the Atlantic side.

The ship size of most interest to us is the Post II, encompassing the size range of 7,500 – 10,000 TEUs. Post II ships, as we have already noted in the previous chapter, are dominating the AWS, Asia/ECSA and the ECSA/ECNA services. We also expect Post II ships to replace the present Panamax during the first period following the expansion to be later on replaced by the larger NPX.
Big Ships

**Figure 5-3** shows the largest ship presently in operations, the Triple-E of Maersk Line. The text boxes at the top of the figure compare the Triple-E to the E-Class ships, previously the largest ship in operations. As seen in this figure and Figure 3-1, the Triple E and the E-Class have almost identical dimensions with the main difference is in width; the Triple-E has 23 rows of containers above deck vs. 22 rows for E-Class. The Triple-E also includes several technological improvements in hull shape and propulsion technology providing for savings in fuel cost and higher capacity. Since Maersk Line ordered 20 Triple-E ships, other lines, among them MSC, CSCL and UASC have order similar ships, while CMA-CGM opted for slightly smaller ships of 16,000 TEUs. The Triple-E, the E-Class and similar ships of other lines are all deployed on Asia/Europe services. Pending on port situations, 18,000-TEU ships could eventually be deployed on other routes such as the AWS, Transpacific, Asia/ECSA and ECSA/ECNA. The 18,000-TEU ships cannot be deployed on Through-Panama services such as the AWP or WCSA/Europe since these ships are much larger than the 13,000-TEU NPX. According to Drewry, a major London-based maritime research firm, 18,000-TEU ships have 30% cost advantage over 13,000-TEU NPX. Hence, deploying these ships on the AWS and Transpacific could provide them with a substantial long-term advantage vis-à-vis the AWP. This is another reason for our assessment that the impact of the Canal expansion on the world’s service pattern is not “game changing” but more of an adjustment of service patterns triggered by the evolution in ship’s size.

**Figure 5-3 18,000-TEU Ship Design**
5.2. Trends in Fleet Composition

Present Fleet and Orderbook

Figure 5-4 shows the composition of the present fleet containerships (defined as cellular fleet), along with the orderbook of new ships, as of December 1, 2013. The data is provided by the Paris-based consultant Alphaliner, the main source of ship’s data for the liner shipping industry. The ships are arranged by TEU-capacity range. Panamax ships are presumably those with capacity below 5,099 TEUs, the largest nominal capacity of these ships. It was already noted above that when fully loaded, these ships cannot transit through the Canal’s locks. The 13,300-TEU in this figure relates to NPX.

Figure 5-4 World’s Containerships Composition

As seen in this figure, the current world fleet of containerships with more than 100-TEU capacity consists of almost 5,000 ships with a combined capacity of 17.3 million TEUs. The fleet is equally divided between ships owned by shipping lines and chartered, with most of the chartered ships concentrated in the smaller size categories. The composition of the orderbook is different than the existing fleet. The largest category in the order book is the 13,300 – 18,500 TEU, or the beyond-NPX, with a total of 85 ships on order vs. 66 ships in the existing fleet; the ratio between the combined TEU capacity of the orderbook in this category to that of the existing fleet (defined as O/E) is 141.3%. In comparison, in the Panamax 4,000 – 5,099-TEU category, the orderbook only includes 51 ships vs. 764 ships in the existing fleet and the O/E is only 15.3%. Most of the ships on order, 130, are concentrated in the Post II, 7,500 – 9,999-TEU category indicating that these ships are becoming the workhorse of the containerized trades.
Ownership of Ships

Figure 5-5 shows the same data of Figure 5-4, but broken down by shipping lines. The figure demonstrates the size differences among lines, with the 3 largest lines, Maersk, MSC and CMA-CGM controlling 36.4% of the entire fleet capacity. These lines, as noted previously, are in the process of creating the P3 Alliance, which is going to be the largest among the 3 super-alliances. The two other super-alliances are the G6 and CKYH. The 3 super-alliances control more than 90% of the world's fleet. Their control will be expanded to almost 100% if recent news realized: Evergreen joins the CKYH, CSAV and Zim join the G6 alliance and Hapag Lloyd merges with Hamburg Sud and CSAV. The alliances' services are currently only involved in the main east/west services: Asia/Europe, Asia/North America and Europe/North America. However, it is quite likely that the cooperation will be expanded in the future to the north/south services as noted in Section 3.1.

The analysis of fleet composition and ship ownership above indicates two related trends:

- Increase in ship size, especially in the post-Panamax categories; and
- Increase in market concentration, with shipping lines organizing themselves in alliances and the alliances controlling almost the entire fleet.

The two trends are inter-related since in order to be able to operate bigger and more economical ships there is a need to generate large volumes of traffic beyond the capability of a single line. For example, in the case of the AWP, following the expansion of Panama Canal, 3 lines operating 3 services with 4,500-TEU ships will be able to consolidate their services into a single service of 13,500-TEU ships (3 x 4,500 = 13,500). According to OOCL, this
consolidation will result in saving of more than 40% in operating cost23 – but will reduce the number of services by two third.

**Overcapacity, Scrapping and Newbuilding**

A major reason underlying the recent restructuring of the liner shipping industry and the emergence of super-alliances is a prolonged imbalance between supply and demand, resulting in deterioration of freight rates and substantial losses to shipping lines. The traditional way of eliminating the oversupply of ships is by scrapping older ships. Indeed, a recent Alphaliner analysis documented a surge in the scrapping of 3,000-5,000-TEU ships, with 76 units sold for demolition in this size range, including 33 units younger than 20 years of age, or about 5 years younger than the traditional scrapping age of 25 years. One reason for the accelerated scrapping is that most of the Panamax in operations are of older and less efficient design with high fuel consumption. The inefficiency of Panamax is demonstrated in a study conducted by the US Army Corps of Engineers (the agency in charge of US port’s channels), which found that partially loaded post-Panamax of 8,000-TEU ships are more cost effective than fully loaded Panamax of 4,500 TEUs.24

The scrapping, according to Alphaliner, will not be enough to restore balance since the new containership deliveries will outpace deletions by a ratio of 3 to 1. Interestingly, the main surplus of ships is expected in the Post II 7,500 – 10,000-TEU category in which, as seen in Figure 5-4, there is large concentration of newbuilding. A similar concern is expressed in a recent analysis by Drewry25, calculating that the supply of these ships is likely to well exceed their demand in the near future.

**Cascading**

The supply of the Post II ships will further increase in the future following the deployment of larger Post III already in the orderbook. This phenomenon, commonly defined as cascading, describe the process in which big ships being deployed on one service replace existing, smaller ships which, in turn, are deployed on another service, replacing smaller ships and so on. For example, 18,000-TEU ships deployed on Asia/Europe service replace 13,000-TEU ships that can be deployed on a Transpacific service replacing 6,000-TEU ships, which then will be deployed on an Asia/ECSA service, etc. Using the example above for service consolidation, one deployment of 18,000-TEU ships will eventually result in releasing 3 6,000-TEU ships that need to be deployed somewhere else. The cascading trends will accelerate in the near future since there is already an urgent need to manage the global excess of container ships. “2014 will see the largest ever annual delivery of 10,000-plus-TEU

---


vessels into the Asia-Europe trade, and carriers will be forced to use all tools at their disposal, including cascading.\textsuperscript{26}

5.3. Implications for T&T

**Caribbean Specialist Services**

Section 3.2 reviewed the types of shipping services relevant to the Caribbean Region. These services were divided there into two categories: Caribbean Specialists and Through-Caribbean. Most of the Caribbean Specialist services, such as the CAM-CGM’s CAGML, BRASEX and MEDCARIB are currently handled by ships of about 2,500 TEUs. The small size of these ships stems from the relatively small volumes of traffic on each of the respective trade lanes they serve: ECNA (excluding Florida), ECSA and Europe/Mediterranean. The PEX2, a joint service by CMA-CGM, CSAV and CSCL, is an exception, employing 5,000-TEU ships, indicating a much the larger traffic volume on the Asia/Mexico/Caribbean trade lane. The future of the Caribbean Specialists was already discussed in Section 3.5, whereby we indicated that the smaller services, which are essentially legacy services, will eventually be absorbed by the much larger Through-Caribbean. One exception could perhaps be the PEX2, mainly because the route of the AWP, the alternative Through-Caribbean, is not expected to stop in the Caribbean.\textsuperscript{27} The ship size of PEX2 is constrained by the existing locks of Panama Canal. Following the expansion and considering the “glut” of Post II ships documented above, it is reasonable to assume that the three lines providing this service will attempt to deploy Post II ships on PEX2 – assuming that the ports of call could handle these ships. This, however, is not the case with T&T ports which are presently limited to only handling Panamax.

**Through-Caribbean Services**

The future of T&T role as a hub is intertwined with its ability to attract Through-Caribbean services. None of these services is presently calling T&T, however. As we discussed in Section 3.2 and illustrated in Figure 3-10, the Through-Caribbean services are further divided according to their general orientation (Diagonal and Vertical) and their involvement with the Canal (Through and Non Canal). The Through-Caribbean services already employ Post II ships of up to 9,000 TEUs on the Non-Canal services and Panamax of up to 5,000 TEUs are deployed on the Through-Canal services. Once the Canal is expanded, Post II ships will also be deployed on Through-Canal services. In the longer-term, as discussed in Section 3.1, larger NPX ships of 13,000 TEUs will be deployed on the Through-Canal services first on the AWP and later on the other services. Consequently, if T&T aspires to retain and enhance its role as a regional hub, its ports should have the capability to handle Post II ships of 7,500 – 10,000 TEUs in the near future and NPX of 13,000 TEUs in the long future.

\textsuperscript{26} King, M., “Overcapacity Challenges Intra-Asia Ocean Carriers”, Journal of Commerce, Jan 09, 2014

\textsuperscript{27} Except in the case of feedering ECNA and GCNA and even in this case only in the Northern Caribbean.
6. SWOT Analysis for T&T Facilities

The objective of this chapter is to catalogue, in a comparative manner, the strengths, weaknesses, opportunities and threats of, first, T&T ports and then, their main competitors. The main competition is on transshipment traffic. Hence, before delving into this analysis, a brief review of the factors affecting shipping lines in their selection of transshipment hub is warranted.

6.1. Factors Affecting Selection of Transshipment Hubs

Our analysis thus far did not differentiate between the various types of transshipment traffic. Such differentiation is necessary, however, for the purpose of the SWOT analysis. There are two generic types of transshipment:

- Relay or Interline – the transfer of boxes between two mainline services or “mother-to-mother”; and
- Hub & Spoke – the transfer of boxes between a mainline and a feeder service, or “mother-to-feeder”.

Based on our interviews with shipping lines and review of professional literature, our estimate is that about one third of the transshipment traffic of the Caribbean hubs is of the relay or interline time.

The factors affecting the selection of hubs are different for each type of transshipment as discussed below.

Relay Transshipment

The most common relay transshipment is “intersection” or the transfer of containers between services routed in different directions. For example, in Figure 3-10, Panama Canal seems as the ideal place for relay transshipment; it “funnels” many services in directions which pass through it. Caucedo could also assume this role by connecting the ECSA/ECNA (north/south) with WCSA/Europe (diagonal) services. Ports usually do not breakdown the transshipment traffic into relay and hub & spoke. T&T location, however, is not conducive for relay transshipment. Indeed, all T&T transshipment traffic is hub & spoke.

Hub & Spoke Transshipment

The majority of the transshipment traffic in the Caribbean Region is hub & spoke. The main factors affecting the selection of a port as a hub for this type of transshipment are:
Minimizing the deviation of the mainline services; and

Proximity to the targeted feedering range, the range of ports for which the hub serves as a distribution center also defined as “catchment area”.

Minimizing deviation saves both on shipping cost and transit time for the mainline. Proximity to the feedering range results in cost and time savings for feeder services.

Deviation-related considerations are only relevant for Through-Caribbean services.

We already demonstrated in Figure 3-8 that for All-Water Panama (AWP) service to call at T&T involves substantial deviation. The AWP services are the main services expected to be impacted by the Canal expansion. Calling T&T involves deviations also for the rest of the Cross-Canal services. Accordingly, the only Through-Caribbean services with routes passing nearby T&T are the East Coast South America (ECSA)/ East Coast South America ECNA+ Gulf Coast North America (GCNA). However, presently no Through-Caribbean service calls at T&T.

**Domestic Cargo**

Shipping lines prefer to conduct their transshipment activity, regardless of type, at hub ports with substantial domestic traffic. Serving the domestic cargo by direct calling saves the cost of transshipping for the domestic traffic and improves the level of service to it. Another advantage is the scale economies in production of port services due to the larger traffic volume.

**Port Facilities**

The listed-above factors only relate to the geographical location of the port and availability of domestic cargo, but not to the port itself: its capability, capacity, productivity and cost. Port capability usually relates to ship size: channel depth, berth length, number and size of STS cranes, etc. In the case of the Caribbean, the ships employed on most mainline services, as discussed in Chapter 5 Ship Size Evolution and Implications for T&T Ports, are expected to be Post II. Accordingly, ports aspiring to become hub ports should be able to handle Post II ships in a productive and cost effective manner.

The overall size (capacity) of the port is also important due to shipping network considerations. Shipping lines have clear preference to having all their services concentrated in a single hub port. This concentration fosters more connections between services and better operational control. Desirably, this hub should also be operated by the shipping line or by the global terminal operator affiliated by them to enhance control.

**Forced Transshipment**

A large share of the transshipment traffic is the result of inadequate port facilities, which “force” shipping lines to forego direct calling by mainline services. This is presently the case in Venezuela whereby despite its large traffic volume of 846,000 TEUs, about 40% of Puerto Cabello’s traffic is handled by feeder services (Section 3-4).
6.2. Categorization of the Caribbean Transshipment Hubs

A common claim in the many studies we reviewed for this analysis is that Caribbean ports are perfect substitutes for performing transshipment. Accordingly, the transshipment traffic can be performed at any port as long as it is located within a hypothetical triangle encompassing the entire Caribbean Region. While we agree that transshipment traffic is “footloose”, we believe that the Caribbean hubs are not perfect substitutes; they can be clearly differentiated according the selection factors above.

We already mentioned the minimization of deviation of the mainline service as a selection factor. A related factor in this respect is the direction of the mainline service. The Caribbean Region’s import traffic is by far higher in volume and value than its export traffic. Accordingly, the so-called “First In” port, or the first port of call of a mainline service in the inbound direction to the Caribbean is the preferred port to serve as a transshipment hub port for this service.

Based on their geographical location the Caribbean hubs can be categorized as:

- Panama & Near-Panama Hubs – Panama/Atlantic, Cartagena and, in the future, Moin;
- Central Caribbean Hubs – Kingston, Caucedo, Ponce;
- Northern Caribbean Hubs – Freeport, and Mariel.
- Eastern Caribbean Hubs – T&T ports, Guadalupe.

Figure 6.1 shows the various hubs, each with its transshipment catchment area. The catchment areas (circles) in this figure only relate to existing ports. As seen in this figure, there is considerable overlapping in catchment areas between several hubs, resulting in fierce competition among them. The following includes a brief SWOT assessment for each of the above-mentioned hubs focusing on their location and other factors.

---

Panama & Near-Panama Ports

The ports in Panama include the Panama Ports Company (PCC), Manzanillo International Terminal (MIT), Colon Container Terminal (CCT), and the Panama Colon Container Port (PCCP), and the near-Panama include ports include Cartagena, Colombia and, in the future, Moin, Costa Rica.

**Strengths:**
- No Deviation by Cross-Panama services for Panama/Atlantic ports; a minor deviation for near-Panama ports;
- Concentration of several services at the same hub due to the Canal’s funneling effect, including those serving Asia, WCSA, WCNA, Australia and, to some extent, Europe trades;
- The “First-In” ports for Asian and WCSA cargoes;
- Large base of domestic cargo (for Near-Panama ports); and
- Ships retain their place in the queue for crossing of the Canal while being handled at the terminal (for Panama/Atlantic ports).

**Weaknesses:**
- Large deviation for Non-Canal, north/south services;
- Relatively high port cost due to government taxes and labor unions;
- Located far away from the future feedering range in EC+GCNA;
Located far away from Eastern and Northern Caribbean; and
Limited domestic cargo.

Opportunities:
- The main beneficial of the Canal expansion, especially if AWP services recapture market share of the Asia/ECNA trade from AWS.

Threats:
- The main losers if AWP services fail to recapture market share of the Asia/ECNA trade from AWS;
- The Venezuela transshipment traffic may partially be eliminated if modern ports are developed in this country; and
- The development of ECNA transshipment may foster a trend for the development Central Caribbean hubs, better located to serve the entire Caribbean Region from a single hub.

Likely Future Role:
- Panama/Atlantic -- similar to the present role as seen in Figure V.1, focusing on relay transshipment and feedering Asian imports to almost the entire Caribbean Region;
- Cartagena -- similar to the present role, focusing on relay transshipment and feedering European and WCSA imports to NCSA and ECCA.

Implications to T&T Ports:
- Panama/Atlantic -- if Asian/Caribbean Specialist services are replaced by Through-Caribbean services, Panama/Atlantic could feeder Asian trade to Eastern Caribbean, including T&T, and eliminates most of T&T transshipment traffic.
- Cartagena – the competitor of T&T for feedering ECNA and ECSA trades to Venezuela.

Central Caribbean Ports
The ports in the Central Caribbean region include Kingston, Jamaica; Caucedo, Dominica Republic; and Ponce, Puerto Rico.

Strengths:
- Minimal deviation for Kingston and a small deviation for Caucedo for Asia/ECSA (AWP) services and vice-versa for ECSA/NCSA and Europe/WCSA;
- Possibility to feeder the entire Caribbean Region and GC+ECNA from a single hub; and
- Possibility to bring together several mainlines for relay transshipment.

Weaknesses:
- Located further away than Freeport for the GC+ECNA feedering range;
- Relatively high labor cost and low productivity for Kingston and, especially, high capital cost of future facilities needed for Post II; and
- Located far away from Eastern and Northern Caribbean.
SWOT Analysis for T&T Facilities

Opportunities:
- The main beneficial of the Canal expansion, similar to Panama/Atlantic ports, if AWP services recapture market share of the Asia/ECNA trade from AWS.

Threats:
- The main losers if AWP services fail to recapture market share of the Asia/ECNA trade from AWS services;
- For Kingston, the development of Mariel, located closer to EC+GCNA, if the US embargo is lifted; and
- For Caucedo, the development of T&T as a distribution hub for ECSA/Caribbean traffic for Eastern Caribbean Islands.

Likely Future Role:
- Kingston – similar to the present role as seen in Figure V.1, focusing on feedering Asian imports, if Fort Augusta developed; and
- Caucedo – similar to the present role, but due to consolidation trends, losing transshipment traffic to Kingston, Freeport and POS, and therefore more focusing on domestic traffic.

Implications to T&T Ports:
- Caucedo competes with T&T on distribution of ECSA trade to Eastern Caribbean.

Northern Caribbean Ports

The ports in the Northern Caribbean region include Freeport, Bahamas and Mariel, Cuba

Strengths:
- Minimal deviation for ECNA services, especially those calling at the US South Atlantic range;
- Possibility to feeder EC+GCNA as well as Northern Caribbean Islands (Cuba, Hispaniola, Puerto Rico);
- Relatively low-cost facilities (for Freeport); and
- Possibility to bring together several mainlines (Asia, Europe, NCSA) for relay transshipment.

Weaknesses:
- Located further away from ECCA and ECNA feeder ranges; and
- No domestic traffic (for Freeport).

Opportunities:
- The main beneficial of the Canal expansion, similar to Panama/Atlantic ports, if AWP services recapture market share of the Asia/ECNA trade from AWS services;
- For Freeport – can be the matching point between AWP and AWS, providing for relay transshipment; and
SWOT Analysis for T&T Facilities

Possibility of becoming the hub of ECNA in case US ports unable to accommodate NPX.

Threats:
- The development of a Central Caribbean hub as a single-hub for the entire Caribbean, EC+GCNA, ECCA and NCSA.

Likely Future Role:
- Freeport – similar to the present role as seen in Figure V.1, focusing on feedering and relay transshipment.
- Mariel – focusing on domestic cargo.

Implications to T&T Ports:
- Limited.

Eastern Caribbean Ports

The ports in the Eastern Caribbean region include the ports of T&T (including Port of Spain, Point Lisas, and La Brea) and Guadalupe’s Pointe-à-Pitre.

Strengths:
- Minimal deviation for ECSA/ECNA services;
- Proximity to Eastern Caribbean Islands and Eastern NCSA, especially Venezuela, Guyana, Surinam and Northern Brazil;
- Proximity to Venezuela’s main ports; and
- T&T – availability of domestic cargo.

Weaknesses:
- Significant deviation for Canal Crossing services;
- Located further away from ECCA and ECNA feeder ranges;
- Limited facilities and low-productivity ports; and
- Guadalupe – limited domestic traffic.

Opportunities:
- T&T – capturing ECSA/ECNA Through-Caribbean services, enhancing transshipment to the existing feeder range and adding Venezuela.
- Guadalupe – capturing direct calls of mainlines.

Threats:
- T&T – the expansion of the Canal may trigger a consolidation of Asia/Caribbean, Europe/Caribbean and ECSA/Caribbean Specialists into respective Through-Caribbean services, concentrating on larger and better located hubs; and
- Development of modern ports in Eastern Caribbean Islands attracting direct calls and, perhaps, limited transshipment to neighboring islands.
Guadalupe – to be feedered through T&T ports and Caucedo following the consolidation in services.

**Likely Future Role:**

T&T -- similar to the present role as seen in Figure V.1, with possible expansion of T&T catchment area to Venezuela.
7. Supply/Demand Balance for the Caribbean Region

7.1. Oversupply in the Caribbean Region

A detailed assessment of both the supply side, or port capacity, and the demand side, or port traffic, of the main transshipment hubs of the Caribbean is included in Section 4.4. The capacity assessment is based on the ports’ own declarations along with our own analysis, based on a set of standard Berth Capacity Indicators. As noted in Section 4.4, the present capacity of the Caribbean ports is higher by about 31% than their present traffic, indicating that there is no shortage of capacity in the Caribbean Region. Moreover, in our review of each of ports we noted that additional capacity could be provided in a relatively short period in the cases of Kingston, Caucedo and Cartagena. We also observe that this is the case in POS, but not in Point Lisas.

Section 4.4 also lists the confirmed expansion plans of the Caribbean hub ports. The expansion projects included in our analysis there only relates to those that can be completed within 3 – 5 years. If all these projects are completed, they will increase the present capacity by 122%. Accordingly, the capacity in 3 – 5 years may grow to 261% of the present throughput, equivalent to a CAGR of 21% over 5 years. This growth rate is way beyond the 2 – 5% growth rate predicted for this period for most countries in the Caribbean Region. Moreover, if needed, many ports have longer-term expansion plans which can be advanced.

Based on the above analysis, we determine that the comparison between the overall supply and demand for port facilities in the Caribbean Region indicates a considerable oversupply. Hence, it is reasonable to assume that most of the expansion projects will be delayed – unless they are mainly required for handling Post II ships. The inability of ports to handle Post II ships may force shipping lines to reroute their services to ports having such capability. The future deployment of Post II on Caribbean services will be triggered by the expansion of the Canal, for Cross-Canal services, service consolidation and cascading as discussed in Chapter 3 Shipping Services and Chapter 6 Ship Size Evolution.

Another change that might trigger accelerated expansion is the emergence of a new transshipment range: EC+GCNA. The new transshipment will emerge as a result from a change in the service pattern of AWP and the deployment of NPX ships. However, as we suggested in Section 3.2 above, the North America feeder ing range is likely to be handled by the Northern and Central Caribbean ports and hence limited influence on T&T ports.

The more relevant supply/demand analysis to T&T ports should specifically relate to the three feeder ing ranges included in T&T’s catchment area: Eastern Caribbean, Surinam/Guyana/North Brazil, and Venezuela. In each feeder ing range, T&T faces competition from different ports as clearly demonstrated by the overlapping areas in Figure 6.1.
7.2. T&T Feeder Ranges

The ports which are in direct competition with T&T in each of the present and potential feeder ranges are:

- Eastern Caribbean – mainly Caucedo, neighboring ports and to a lesser extent Kingston;
- Guyana/Surinam/North Brazil – this range, for all practical purposes, is captive to T&T; and
- Venezuela – mainly Cartagena and to a lesser extent Panama, Kingston and Caucedo.

The following sections assess the competitive position of T&T in each of the feeder ranges above.

Competition for Eastern Caribbean Transshipment

Caucedo is T&T’s main competitor in this range. T&T and Caucedo are located at the south and north end of this range. Accordingly, T&T has advantage feeder ing the southern islands while Caucedo has advantage feeder ing the northern ones, including the much more populated Puerto Rico and Haiti. Caucedo also has a much larger domestic-cargo base.

The container terminal in Caucedo, as described in Section 4.3, is private. The terminal is operated by DPW, a global terminal operator known for its sophistication and high productivity. The present facilities are modern, although still lacking the ability to handle Post II ships. The terminal is operating close to its nominal capacity. However, a planned, relatively low-cost expansion will provide Post II capability and double present capacity, adding 1.2 million TEUs to the present capacity of 1.25 million TEUs.

A second Caribbean competitor of T&T in the Eastern Caribbean range is Kingston. Like Caucedo, Kingston does not lack capacity; Kingston can add 1.70 million TEUs of capacity at a relatively-low cost to its present capacity of 1.50 million TEUs. But also like Caucedo, present facilities lack capability to handle Post II ships. Kingston could only reach 15 m of depth alongside its existing dock, short of the 16 m required for Post II. A full Post II capability and a huge addition to capacity could be accomplished only if the plans for Fort Augusta are realized. However, the Fort Augusta terminal is high cost, estimated at $900 million. Unlike Caucedo, Kingston suffers from problems in productivity and availability of equipment.

Another competitor of T&T in the Eastern Caribbean is the Port of Guadalupe. The present facilities of Pointe-à-Pitre are small and inadequate. However, Guadalupe has ambitious development plans to become “the Lesser Antilles’ hub for containerized transport” as stated by the Guadalupe Port Authority. These plans rely on the major growth in trade following the expansion of Panama Canal... As elaborated in Section 5.17, it is difficult to assess if any of these plans will ever be realized. Still, even the improvement of present facilities may induce more direct call and, perhaps, more transshipment – at the expense of T&T ports.

Altogether, there is no shortage of terminal capacity for feeder ing this range.
Competition for Guyana, Surinam and Eastern North Brazil Transshipment

T&T ports do not face meaningful competition in this range. The dominance of T&T is mainly due to its geographical proximity. A potential competition could arise, though, if the ports currently feeding Venezuela, mainly Cartagena, extend their reach to serve this range as well. Likewise, the local ports in this region are shallow, river ports and the prospect of deepening them for mainline services is unrealistic.

The essentially only hub for this feeding range is T&T’s POS. This port is operating at capacity and lacks Post II capability.

Competition for Venezuela Transshipment

Venezuela is the feeding range with the largest transshipment potential of all the major Caribbean hubs – except for T&T ports. We already demonstrated in Section 6.1 that there is no shortage in port capacity in the Caribbean Region. Two hub ports, Panama/Atlantic and Cartagena, both heavily involved in feeding Venezuela, already possess Post II capability.

No Shortage of Port Capacity for T&T’s Feeding Ranges

Presently, there is no shortage of capacity in any of the feeding ranges relevant to T&T. There is, however, lack in Post II capability in some of the hubs, among them Caucedo, Kingston and T&T. Caucedo. Such Post II capability will be developed in the near future when these ports’ confirmed expansion plans are implemented. These plans also will substantially increase capacity. Hence, we do not expect shortage in capacity and capability also in the near future and, perhaps, even in the long future.

The observations above regarding capacity are based on our analysis of the relevant Caribbean Region ports in Chapter 4. The focus in reviewing the expansion plans there is on plans that could be realized within 3 – 5 years, including those of T&T ports. However, it is unreasonable to expect that all of these plans will indeed be realized in this timeframe – or ever. The study’s timeframe horizon is 2025. Within this long timeframe, the ports reviewed are likely to develop additional plans. For example, Kingston could add more modules to Fort Augusta as indeed seen in some of the masterplans reviewed by us, or Caucedo could increase its breakwater berths through a massive reclamation. Also, it is quite likely that new regional ports will be developed in the region within this long timeframe.29 Hence, assessing port capacity to the year 2025 seems highly speculative. It might also be useless for the purpose of this study, considering large near-future overcapacity situation and the predictions for modest traffic growth as discussed in the next chapter.

29 It is also quite likely that change in port technology will dramatically increase capacity. For example the STS cranes ordered for the new Rotterdam terminals are tandem lift (4 TEU/lift) and remote-controlled with preparation for full automation allowing for higher acceleration and shorter cycle time. The expected result is a much higher crane productivity and the respective berth capacity.
8. T&T Demand Forecast to 2025

8.1. Forecasting Domestic Traffic

The traffic served by T&T ports is composed from two segments, domestic and transshipment. The methodology employed for forecasting each segment is different and discussed therefore in a different section.

The forecast methodology for the domestic traffic is based on correlating it with the country’s GDP (see section 2.4). Figure 8-1 shows the historical relationship between T&T GDP and the domestic traffic, or imports and exports. As seen in this figure, the correlation coefficient is quite high, 0.93, suggesting that GDP is a reliable predictor for port traffic. Similar correlation also is found in many countries and therefore it is widely applied for traffic forecasting. Figure 8-2 shows the historical traffic development along with our forecast based on the regression equation presented in Figure 8-1 and the GDP values presented in section 2.4, Future Trends. As seen in this figure, the Compounded Average Growth Rate (CAGR) for the period 2012 – 2025 is 2.8%. The forecasted CAGR is lower than the 5.0% derived from the period 2002 – 2012, reflecting mainly the slowdown in economic growth forecasted for T&T by the IMF in the short term.

Figure 8-1 The Relationships between Traffic and GDP
8.2. Forecasting Transshipment Traffic

Supply/Demand Balance

The analysis of the supply/demand relationship in the previous chapter determined that supply, or port capacity, substantially exceeds demand, or port traffic, in both the Caribbean Region as a whole and in the specific feeding ranges that T&T presently or potentially serves. Moreover, it seems that the over-capacity situation is bound to exacerbate in the future as many Caribbean ports, fueled by the Canal-expansion-related expectations, will launch ambitious development plans. In light of the over-capacity situation, forecasting T&T transshipment cannot be based on a simple comparison between supply and demand. Likewise, the suggestion made in the Strategic Plan of attracting “spill over”, or transshipment traffic due to lack in capacity is not supported by our analysis indicating substantial oversupply situation in all Caribbean hubs.

Transshipment Scenarios

Factors Defining Scenarios

T&T has captured about 200,000 TEUs of transshipment in recent years – despite the oversupply situation and the fierce competition for transshipment, and despite T&T ill-equipped port facilities. This reflects the relative advantage that T&T possess in its present feeding ranges, the Eastern Caribbean and Eastern NCSA. This advantage, in turn, stems from T&T geographical position relative to the shipping lanes and its relatively-large domestic cargo base, as elaborated in Section 7.1 Factors Affecting Selection of Transshipment Hubs.
Our forecasting methodology is based on defining reasonable assumptions regarding these factors, especially regarding likely future changes in them, and assessing their impacts on T&T prospects to attract transshipment traffic in its present and potential feedering ranges. More specifically, the forecasting scenarios defined below relate to the impacts of future rationalization of the shipping service patterns (if realized) and improvement (or no improvements) in the facilities of ports in T&T feedering ranges, especially in Venezuela.

The scenarios described in the following sections only relate to the impact of factors outside T&T ports. The implicit assumption in our forecast is that T&T ports will have Post II capability, productive and cost effective operations, and the capacity to handle the additional transshipment and domestic traffic. If T&T ports remain unchanged, it is quite likely that T&T will lose its present status as a secondary hub ports.

**High Growth Scenario**

The assumption underlying this case is a far-reaching change in the transshipment pattern of shipping services involved in two of the three T&T’s feedering ranges:

- **Venezuela** – following the rationalization of ECSA/Caribbean services and assuming no change in the Venezuela’s port situation, T&T feeders part of this country’s ECSA trade; and
- **Eastern Caribbean** – following the rationalization of Asia/Caribbean and ECSA/Caribbean services and, especially, the deployment of Post II ships on these services, some of the countries currently called directly or feedered by other hubs will be feedered by T&T ports.

T&T’s additional transshipment traffic in this scenario will be the result of: (a) capturing Venezuelan ECSA traffic currently either handled by direct calling or feedered by Cartagena, Panama/Atlantic and to a lesser extent Kingston and Caucedo; (b) further conversion to T&T-based feeders of Eastern Caribbean traffic currently handled by direct calling; and (c) capturing of Eastern Caribbean transshipment traffic currently feedered through Caucedo and to a lesser extent Kingston. A more elaborate assessment of the Venezuelan situation is included in Section 3.4, in the subsection Prospects of Transshipping Venezuela.

**Base-Line Scenario**

The assumption underlying the base case is simple: no changes in service patterns, Venezuela ports and Eastern Caribbean ports. Accordingly, in the base case, T&T retains its present market share in the transshipment to its feedering ranges. The only change is that the traffic of the feedered countries gradually grows as time passes, in line with the growth of their GDP. For the purpose of long-term forecasting, we can assume that these countries have similar economic situation to T&T and accordingly, the growth rate of their traffic is similar to that assumed for T&T domestic traffic.

**Low Growth Scenario**

The assumptions underlying this scenario relate to major improvements of ports in the existing and potential feedering ranges of T&T:

- **Venezuela** – following the development of modern port facilities, shipping lines enhance direct calling, eliminating the need to transship a large portion of Venezuela’s trades; and
Eastern Caribbean – following the development of modern port facilities in several Eastern Caribbean countries shipping lines enhance direct calling, eliminating the need to transship in T&T and perhaps also shift some transshipment from T&T to these ports.

T&T’s loss of transshipment traffic in this scenario will mainly be the result of reduction in the overall transshipment activity in the Eastern Caribbean countries.

8.3. Forecasting Model Assumptions and Results

The main assumptions underlying this model are:

- The base year is 2012; T&T domestic traffic amounts to 330,000 TEUs and its transshipment traffic to 240,000 TEUs (average of recent years);
- The base traffic CAGR for T&T and the countries in its feeding ranges is 1.3%;
- Venezuela-related transshipment traffic consists 30% of Cartagena, 25% of Panama/Atlantic, 20% of Kingston and 15% of Caucedo transshipment traffic;
- About 40% of Venezuela total traffic is feedered; 30% of it is related to ECSA; T&T can capture about half of the ECSA transshipment with the rest remaining mostly at Cartagena;
- T&T may gain or lose about 30% of its present transshipment traffic related to Eastern Caribbean and Eastern NCSA following the changes described in the High and Low Scenarios;
- The changes assumed in the forecast scenarios, including introduction of Post II capacity in T&T, take place in 2018; and
- The target year of the forecast is 2025.

Results of Forecasting Model

The calculation of T&T traffic forecast for both domestic and transshipment traffic is conducted by a spreadsheet model. The results of our forecasting models for 2025 are presented in Figure 8-3.

Figure 8-3 Forecast Model's Results

<table>
<thead>
<tr>
<th>Scenario</th>
<th>Type of Traffic</th>
<th>2012</th>
<th>2018</th>
<th>2025</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>M TEU</td>
<td>CAGR</td>
<td>M TEU</td>
</tr>
<tr>
<td>Base</td>
<td>Domestic</td>
<td>0.33</td>
<td>1.31%</td>
<td>0.36</td>
</tr>
<tr>
<td></td>
<td>Transhipment</td>
<td>0.24</td>
<td>1.31%</td>
<td>0.26</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>0.57</td>
<td></td>
<td>0.62</td>
</tr>
<tr>
<td>High</td>
<td>Domestic</td>
<td>0.33</td>
<td>1.87%</td>
<td>0.37</td>
</tr>
<tr>
<td></td>
<td>Transhipment</td>
<td>0.24</td>
<td>1.87%</td>
<td>0.53</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>0.57</td>
<td></td>
<td>0.89</td>
</tr>
<tr>
<td>Low</td>
<td>Domestic</td>
<td>0.33</td>
<td>0.75%</td>
<td>0.35</td>
</tr>
<tr>
<td></td>
<td>Transhipment</td>
<td>0.24</td>
<td>0.75%</td>
<td>0.19</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>0.57</td>
<td></td>
<td>0.53</td>
</tr>
</tbody>
</table>
High-Growth Scenario – a total of 1.12 million TEUs consisting of 460,000 TEUs domestic and 660,000 TEUs transshipment;

Base-Line Scenario – a total of 810,000 TEUs consisting of 470,000 TEUs domestic and 340,000 TEUs transshipment; and

Low-Growth Scenario – a total of 620,000 million TEUs consisting of 400,000 TEUs domestic and 220,000 TEUs transshipment.
9. Conclusion vis-à-vis Trinidad’s Regional Position and Need for Expansion

9.1. T&T Regional Position

We do not expect a meaningful change in T&T regional position and its role as a secondary hub. Our main observations are:

- Panama Canal expansion will have small impact on the Caribbean Region and even smaller than that on T&T ports. The main impact of the Canal expansion will be on the Asia/ECNA trade lane. T&T currently is not involved in this trade and is not expected to be so in the future.

- The Canal expansion will result in the deployment of Post II ships of 7,500 – 10,000 TEUs on Cross-Canal services to be replace, in the long future, by larger NPX ships of 13,000 TEUs. Post II ships are already deployed on Through-Caribbean, Non-Canal services on the ECSA/ECNA trade lane.

- The Canal expansion may generate additional transshipment of ECNA traffic, but it will be handled by nearby hubs such as Freeport, Kingston and, perhaps, Mariel.

- To take advantage of the larger ships, the service pattern of Caribbean services is likely to be transformed from Caribbean Specialist to Through-Caribbean services. The transformation process will also include consolidation (rationalization) of services, which may result in increase in transshipment traffic. Part of the additional transshipment traffic could be captured by T&T ports.

- Demand for transshipment, especially the hub & spoke portion of it, is regionalized, with each Caribbean hub port having its “catchment area” consisting of several feedering range. Because of the overlapping catchment areas, there is a fierce competition for transshipment traffic among the Caribbean hubs.

- Through-Caribbean services do not presently call T&T. T&T prospects to retain its role as a secondary hub depends on its ability to attract such services especially those serving the ECSA/ECNA and ECSA/GCNA trade lanes. The prospects of T&T to attract other Through-Caribbean services are dim because its location involves large deviation.

- T&T is likely to maintain it present role as a hub ports for its present catchment area, consisting of two feedering ranges: the Eastern Caribbean Islands and Eastern NCSA. T&T may add a third feedering range, Venezuela, if the port situation of this country remains unchanged.

- There is no shortage in port capacity for transshipment in the Caribbean Region, including in ports competing with T&T on the same feedering ranges.
Conclusion vis-à-vis Trinidad’s Regional Position and Need for Expansion

T&T future transshipment traffic depends, therefore, on the capability, capacity, productivity and cost effectiveness of its ports, which are the prerequisites for our traffic forecast scenarios.

The scenarios reflect likely future trends in economic growth, pattern of shipping services and port situation in T&T’s catchment area.

T&T’s 2025 forecast is for 1.12 million, 810,000 and 620,000 TEUs for the High, Base and Low Growth scenarios.

9.2. Options to Provide Needed Expansion

The total traffic forecasted for 2025 in the High-Growth Scenario, 1.24 million TEUs, is about twice the 550,000 TEUs handled in 2012 by T&T ports. T&T’s ports are presently operating at near-capacity. Hence, if T&T’s port development plan aspires to handle the High-Growth Scenarios, port capacity has to be doubled in the near future. More important than the need to increase capacity is the need to upgrade capability to Post II, without which T&T may lose its position as a hub port along with most of its transshipment traffic.

T&T current facilities include POS with 500 m of berth served by STS and 200 m served by MHC; Point Lisas has 200 m of STS and 110 m of MHC. There are three general options to increase capacity and capability to accommodate the forecasted traffic in T&T’s High-Growth Scenario:

- Rehabilitate POS – modify and extend Berth 8, remove non-essential facilities and activities to off-dock dry port(s), add modern equipment and dredge the access channel to 16m;
- Develop a new port in Point Lisas – construct 600-m of berthage and respective yard area via reclamation and dredge the access channel to 16 m; and
- Develop a new port at La Brea – construct 800-m of berthage with respective yard area on mostly existing area and dredge the access channel to 16 m.

Each of the above options results in the creation of about 800-m STS berth, sufficient for handling ALL the expansion needs of T&T in the High-Growth Scenario. Put differently, T&T traffic forecast can justify only one modern container terminal capable of serving Post II ships. Hence, the strategic decision facing T&T government authorities is which of the above options to pursue.
10. T&T Opportunities and Challenges for other Maritime Facilities

10.1. Opportunities for Growth of the Ship Repair Sector

Core demand for dry-docking

Every vessel is subject to a repair and maintenance regime the nature and scope of which is a matter for individual ship owners (Drewry 2011). Ship repair yards offer periodic repair and maintenance and inspection and survey services to ship owners. The core demand for periodic ship repair and maintenance work stems from the mandatory conditions of the classification society and the statutory requirements of the Flag State Authority for ship registration.

The Flag State Administration is responsible for the enforcement of national legislation and regulations established in compliance with the guidelines set by the International Maritime Organization (IMO) for the adoption of international conventions to which the Flag State is a signatory. In order to renew ship's certificates, the classification society requires ships to conduct two surveys and a special dry-dock survey at every five year interval. Finally, company policy, insurances and management strategies determine the vessel maintenance systems used, which may include preventative, planned and breakdown maintenance and minimum maintenance modes during periods of low utilization of vessel assets and freight earnings.

Normally repair calls occur when a ship is off-hire in which case proximity to the major shipping lanes and the cost of deviation to the dry-dock location is important. Periodic dry-docking is planned in advance and based on an approved expenditure budget for general dry dock works and other dry dock related scope of works, which may be direct and indirect contracted works for hull and machinery. Dry-docking yards quote on the scope of works. The selection of a dry-dock is based on a number of factors including reputation, proximity to the dry-dock, availability, quality and competitive bids.

Routine maintenance also takes place during vessel operation in relation to cleaning and maintenance, consumables, engine and lube oil changes and other minor electrical and mechanical repair and maintenance, which do not warrant the removal of the vessel from service.

In addition, the requirement for unscheduled repairs may arise due to grounding, accidental collision, breakdown and other unforeseen incidents.
The key determinants of dry-dock costs
Ships are capital investments with high fixed costs and relatively low running costs – only exceptionally are ships laid off. Vessel costs are categorized into capital cost and running cost. The capital cost of the vessel is regarded as the fixed cost of the vessel. The running cost of the vessel is regarded as the variable cost of operating, voyage, periodic maintenance and cargo handling costs related to the running of the vessel (Stopford 2009).

The total vessel costs may be classified as follows:

- Operating cost, which includes manning costs, stores and lubricants, repairs and maintenance, insurance and general administration costs.
- Periodic maintenance cost, which includes dry-docking repair and maintenance, surveys and inspections.
- Voyage cost, which includes fuel oil, diesel oil, port costs and canal dues.
- Cargo handling cost, which includes discharge and loading costs.
- Capital cost, which includes the principal and interest repayment over the amortized loan period.

In a study designed to determine the key determinants dry-docking costs, 414 repair invoices were reviewed for tanker ship repair work performed by one of the largest ship repair yards in the Persian Gulf. The study concluded that dry-dock costs added 20% to operating cost every five years (Apostolidis, Kokarakis and Merikas 2012).

Figure 10-1 gives the benchmark operating costs for Very Large Crude Carrier (VLCC) tankers for the year 2007. The major component of the operating cost is the manning cost, which contributes almost 50% of the total followed by the repair and maintenance which comprise close to 17%.

Figure 10-1 Annual Operating costs (0,000 US$ per year)
**Figure 10-2** shows the impact of dry-docking cost compared with operating cost for the same five year period. Dry-docking adds 20% to the annual operating cost at every five year interval, equivalent to between 4-5% of operating cost per annum, which is normal in shipping costs.

**Figure 10-2 Dry-docking versus operating cost (0,000 US$ per year)**

<table>
<thead>
<tr>
<th>Tanker Size</th>
<th>Dry-Docking Cost</th>
<th>Annual Operating Cost</th>
<th>Dry-Docking × 2 times</th>
<th>Five-Year Operating Cost</th>
<th>Dry-Docking Versus Operating</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chemical</td>
<td>1,244</td>
<td>2,256</td>
<td>2,489</td>
<td>11,280</td>
<td>22%</td>
</tr>
<tr>
<td>Product</td>
<td>1,319</td>
<td>2,498</td>
<td>2,639</td>
<td>12,491</td>
<td>21%</td>
</tr>
<tr>
<td>Panamax</td>
<td>1,286</td>
<td>2,877</td>
<td>2,572</td>
<td>14,386</td>
<td>18%</td>
</tr>
<tr>
<td>Aframax</td>
<td>1,359</td>
<td>2,610</td>
<td>2,719</td>
<td>13,048</td>
<td>21%</td>
</tr>
<tr>
<td>Suezmax</td>
<td>1,460</td>
<td>2,925</td>
<td>2,921</td>
<td>14,625</td>
<td>20%</td>
</tr>
<tr>
<td>VLCC</td>
<td>1,601</td>
<td>3,493</td>
<td>3,203</td>
<td>17,464</td>
<td>18%</td>
</tr>
</tbody>
</table>

The study further concluded that the major determinants of dry-docking costs are age, size in deadweight weight tons (dwt) and stay days at dry-dock as follows:

- The age of a ship is calculated from the date the ship is delivered by the builders to the owners. Older ships require more extensive repairs and maintenance than newer ships therefore the age of a ship is positively correlated with the dry-docking cost.

- The size of tankers is taken from the deadweight (dwt) capacity or carrying capacity. Deadweight is equal to cargo + bunkers + stores + provisions + crew. Therefore the size of the ship is positively associated with the extent of dry-docking cost.

- The stay days are calculated from the ship’s arrival date at the dry-dock yard until the departure date. A part of the days are spent in dry-dock (normally 5-7 days) and rest of the remaining days spent berthed alongside to complete repairs.

**Global Shipping Market**

*Structure of the world merchant fleet*

**Figure 10-3** shows the structure of the world fleet by principal vessel types over the period 1980-2013 in millions of dwt. The year 2012 saw the turn of the largest shipbuilding cycle in terms of gross tons in recorded history. Between 2001 and 2011, year on year, newbuilding deliveries reached new historical highs. Even after the economic downturn of 2008, the dead weight tonnage delivered annually continued to increase for three (3) more years due to orders that had largely been placed prior to the crisis. Only in 2012, for the first time since 2001, was the fleet that entered into service less than that of the previous year. In spite of the decline in new deliveries the world tonnage continued to grow in 2012 at a slower rate and year on year growth amounted to 6% compared to the 10% increase the previous year.
The world fleet more than doubled since 2001 reaching 1.63 billion dwt in January, 2013 (UNCTAD 2013).

**Figure 10-3 World fleet by principal vessel types in millions dwt (1980-2013)**

![Figure 10-3 World fleet by principal vessel types in millions dwt (1980-2013)](source)

**Figure 10-4** shows the turning point in the shipbuilding cycle as evidenced by the age structure of the existing fleet. There was more tonnage built in 2011 (that is, 2 years old) than built in 2012. Such a large weakening has not occurred since the middle of the 1990s. The turning point is also shown in Figure 10-4, which highlights the regression in the order book in 2009. The current schedule shows output of close to recent levels for 2013 and less so for 2014.

The numbers in the shipping fleet react only slowly to a changing economic environment. The downturn in demand became clear in 2008 with the order book showing a decline in 2009 and a decrease in new deliveries in 2012. However, the existing fleet continued to grow in 2013. (UNCTAD 2013).

In January, 2013, 20% of the world merchant fleet was younger than 5 years, representing 40% of the world dead weight tonnage. In more recent years ship size has also grown. Container ships are now 3 times larger than 20 years ago and only 20% of container ship tonnage is older than 20 years. Oil tankers are also replaced at an earlier age. Only 4% of oil tanker tonnage was built more than 20 years ago. In January, 2013, the average age was highest for general cargo ships (25) followed by oil tankers (16.7), container ships (10.8) and dry bulk carriers (9.9). Following the surge in newbuildings in the dry bulk segment almost 50% of the dry-bulk dead weight tonnage is only 4 years old overtaking container ships as the youngest vessel category for the first time (UNCTAD 2013).
Figure 10-4 Age distribution of the world merchant fleet by vessel type (% of total ships and dwt) January, 2013

<table>
<thead>
<tr>
<th>Country grouping</th>
<th>Types of vessels</th>
<th>0-4 years</th>
<th>5-9 years</th>
<th>10-14 years</th>
<th>15-19 years</th>
<th>20 years and +</th>
<th>Average age (years) 2013</th>
<th>Average age (years) 2012</th>
<th>Percentage change 2013/2012</th>
</tr>
</thead>
<tbody>
<tr>
<td>WORLD</td>
<td>Bulk carriers</td>
<td>41</td>
<td>16</td>
<td>12</td>
<td>13</td>
<td>16</td>
<td>9.94</td>
<td>11.57</td>
<td>-1.63</td>
</tr>
<tr>
<td></td>
<td>Dwt</td>
<td>49</td>
<td>16</td>
<td>16</td>
<td>11</td>
<td>13</td>
<td>9.36</td>
<td>11.71</td>
<td>-2.35</td>
</tr>
<tr>
<td></td>
<td>Average vessel size (dwt)</td>
<td>81,514</td>
<td>75,173</td>
<td>65,406</td>
<td>71,029</td>
<td>46,211</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Container ships</td>
<td>Ships</td>
<td>23</td>
<td>29</td>
<td>18</td>
<td>20</td>
<td>16</td>
<td>10.81</td>
<td>10.73</td>
<td>0.08</td>
</tr>
<tr>
<td></td>
<td>Dwt</td>
<td>34</td>
<td>32</td>
<td>16</td>
<td>13</td>
<td>5</td>
<td>8.25</td>
<td>8.24</td>
<td>0.01</td>
</tr>
<tr>
<td></td>
<td>Average vessel size (dwt)</td>
<td>53,547</td>
<td>43,762</td>
<td>37,049</td>
<td>26,750</td>
<td>19,962</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>General cargo</td>
<td>Ships</td>
<td>12</td>
<td>11</td>
<td>7</td>
<td>12</td>
<td>16</td>
<td>24.99</td>
<td>24.56</td>
<td>0.41</td>
</tr>
<tr>
<td></td>
<td>Dwt</td>
<td>22</td>
<td>13</td>
<td>10</td>
<td>10</td>
<td>4</td>
<td>19.10</td>
<td>19.61</td>
<td>-0.51</td>
</tr>
<tr>
<td></td>
<td>Average vessel size (dwt)</td>
<td>7,395</td>
<td>5,257</td>
<td>6,845</td>
<td>3,765</td>
<td>3,081</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Oil tankers</td>
<td>Ships</td>
<td>24</td>
<td>20</td>
<td>10</td>
<td>12</td>
<td>12</td>
<td>16.74</td>
<td>16.50</td>
<td>0.25</td>
</tr>
<tr>
<td></td>
<td>Dwt</td>
<td>37</td>
<td>28</td>
<td>20</td>
<td>10</td>
<td>4</td>
<td>8.14</td>
<td>8.01</td>
<td>0.13</td>
</tr>
<tr>
<td></td>
<td>Average vessel size (dwt)</td>
<td>69,023</td>
<td>64,212</td>
<td>67,609</td>
<td>36,925</td>
<td>5,321</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Others</td>
<td>Ships</td>
<td>17</td>
<td>13</td>
<td>10</td>
<td>10</td>
<td>50</td>
<td>22.57</td>
<td>22.29</td>
<td>0.28</td>
</tr>
<tr>
<td></td>
<td>Dwt</td>
<td>23</td>
<td>20</td>
<td>13</td>
<td>10</td>
<td>34</td>
<td>16.07</td>
<td>15.84</td>
<td>0.23</td>
</tr>
<tr>
<td></td>
<td>Average vessel size (dwt)</td>
<td>6,853</td>
<td>8,251</td>
<td>6,888</td>
<td>5,119</td>
<td>3,968</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>All ships</td>
<td>Ships</td>
<td>20</td>
<td>16</td>
<td>10</td>
<td>12</td>
<td>44</td>
<td>20.34</td>
<td>20.30</td>
<td>0.03</td>
</tr>
<tr>
<td></td>
<td>Dwt</td>
<td>40</td>
<td>22</td>
<td>14</td>
<td>12</td>
<td>12</td>
<td>9.60</td>
<td>10.15</td>
<td>-0.59</td>
</tr>
<tr>
<td></td>
<td>Average vessel size (dwt)</td>
<td>40,884</td>
<td>32,947</td>
<td>31,610</td>
<td>21,298</td>
<td>6,267</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Newbuilding**

Figure 10-5 shows the profile of world tonnage on order for the period 2000 to 2013. Following the peaks in 2008 and 2009 the tonnage on order has drastically declined over the last few years. Far fewer new orders were placed since the economic crisis of 2008 and shipyards continued to deliver pre-ordered tonnage. The order book went down by 50% for containerships; 58% for dry bulk ships; 65% for tankers and by 67% for general cargo ships as compared to the previous peaks.

Figure 10-5 World Tonnage on order 2000-2013 (000s dwt)

Source: Compiled by the UNCTAD secretariat, on the basis of data supplied by Clarkson Research Services.
Note: Propelled seagoing merchant vessels of 100 GT and above; beginning of year figures.
Figure 10-6 shows that in 2012 a total of 95.3 million gross tons of ships were built in China, South Korea and Japan accounting for 92% of total tonnage built. It is evident that the shipbuilding market is located in the Far East.

**Ship demolition market**

Figure 10-7 shows that a total of 36.3 million gross tons of ships were sold for demolition in 2012 with China and Indian subcontinent accounting for over 90% of the tonnage demolished. It is evident that the demolition market is located in China and the Indian subcontinent.
**Tonnage Utilization**

*Figure 10-8* shows that in early 2013, almost 99% of the tonnage was in service. Container ships, had the highest utilization rate (99.85%) and offshore supply vessels had the lowest utilization rate (84.52%).

![Figure 10-8 Tonnage utilization by vessel type (% dwt) Jan 2013](chart)

**Global Ship Repair Market**

The pattern of international trade and trade routes influences the ship repair distribution. This provides advantages to locations near to load and discharge ports or places where, for ballasting vessels, the cost of diversion from the sea lane is not substantial.

The biggest constraints are faced by the largest vessel sizes, which can only enter the largest yards. The very large ship sector has continued to grow in order to derive the economic benefit of economies of scale. In so doing, the market has become more complicated and now includes VLCCs, ULCCs, Capsize bulk carriers, VLBC, Chinamax (400,000 dwt), Mega container ships in anticipation of the Panama Canal, large Rigs and Platforms and other Offshore Structures.

*Figure 10-9* shows that the largest dry-dock facilities are located in China, Singapore, Middle East, other Far East, Europe/ Med/ North Africa, North-Western Europe/ Baltic and Scandinavia.

The North American/ Caribbean region has two (2) large dry-docks capable of accommodating vessels greater than 200,000 dwt and seven (7) smaller dry-docks capable of accommodating Cape/Suezmax vessels between 120,000 and 200,000 dwt. The USA is not regarded as a major ship repair location (Drewry 2011).
Figure 10-9 Large Dock Distribution

<table>
<thead>
<tr>
<th>Country</th>
<th>VLCC/VLOC (&gt;200,000 dwt)</th>
<th>Cape/Suezmax (120-200,000 dwt)</th>
<th>Total (of these)</th>
</tr>
</thead>
<tbody>
<tr>
<td>China</td>
<td>31</td>
<td>15</td>
<td>36</td>
</tr>
<tr>
<td>Singapore</td>
<td>9</td>
<td>5</td>
<td>14</td>
</tr>
<tr>
<td>Middle East</td>
<td>9</td>
<td>9</td>
<td>18</td>
</tr>
<tr>
<td>Indian sub-continent</td>
<td>1</td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Other For East</td>
<td>10</td>
<td>6</td>
<td>16</td>
</tr>
<tr>
<td>Turkey</td>
<td>2</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>Other Black Sea/Eastern Europe</td>
<td>3</td>
<td>4</td>
<td>7</td>
</tr>
<tr>
<td>EuroMed/N Africa</td>
<td>6</td>
<td>5</td>
<td>11</td>
</tr>
<tr>
<td>Iberia</td>
<td>0</td>
<td></td>
<td>0</td>
</tr>
<tr>
<td>NW Europe/Baltic/Scandinavia</td>
<td>8</td>
<td>10</td>
<td>18</td>
</tr>
<tr>
<td>Other Africa</td>
<td>1</td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>N. America/Caribbean</td>
<td>2</td>
<td>7</td>
<td>9</td>
</tr>
<tr>
<td>S. America</td>
<td>4</td>
<td></td>
<td>4</td>
</tr>
<tr>
<td>Australasia</td>
<td>1</td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Total</td>
<td>81</td>
<td>55</td>
<td>136</td>
</tr>
</tbody>
</table>

Notes: Some of the above facilities have commitments to military/shipyard work (e.g. USA, Greece, Eastern Europe). Some uncertainty over availability of Japanese yards for repairs as opposed to newbuilding. Some uncertainty over availability of Brazilian yards for repairs as opposed to newbuilding. Some facilities might suggest rearrangement or offshore rigs. Large dock in Marseilles currently inactive.

Source: DM Jupe Consulting, Drewry Maritime Research

Figure 10-10 shows that the main dry-dock distribution by size in the North American/Caribbean region is in the Panamax/Aframax range between 60,000 and 120,000 dwt.

Costs and competition

The main drivers in the dry-dock services are the facilities, competition, costs and currency factors. For ship owners, the current decade opened with repair and maintenance budgets at a ten (10) year low. By 2005 a rapid uptrend had taken hold. In 2006, costs exceeded the previous peak set in 1993 and finally peaked in 2008. Certainly, 2009 and 2010 were two (2) years of reduced outgoings. In 2010 and 2011 many owners reverted to minimum maintenance mode in order to accommodate special surveys and other mandatory and unavoidable steel work replacement only. Discretionary work would have been deferred.
As the shipping market continues to operate in the recovery stage of the shipping cycle, short term repair work previously deferred will have to be remedied and there should be an upward trend in the ship repair market. The pace will be enhanced as the global fleet continues to grow. There will be some increase in the ship repair capacity however, its impact is likely to be over dramatic and a return to the high levels achieved in 2008 seems unlikely through to 2015. Critical influences on the future of ship repair costs will include labour costs, steel and steelwork costs, paints and coatings work costs, the price of spares and currency exchange rates.

**Labour costs**
Ship repair is a very labour intensive business and labour costs vary from country to country. Indeed quite a number of ship repair yards located in the Far East and Middle East locations rely on low cost imported labour. The ship repair industry also draws on a number of specialist skills and the level of training and development is related to the efficiency and productivity of the labour force. None of these factors are expected to change in the short to medium term. Under current economic conditions the cost of labour and the skill and staff shortages is expected to remain the same in most locations.

**Steel and steelwork costs**
The steel market is weaker than it was prior to the recession of 2009. Steel prices peaked in mid-2008 and then plummeted. By year end all of the 2008 price gains had been lost and prices decreased in 2009 through to the mid-year before a modest rebound occurred. The increase in prices, which was experienced in Asia, was largely influenced by China’s economic stimuli on the rest of the region. In European Union (EU) the price of steel remained weak. Although steel producers forced through iron ore prices cuts for 2010, steel prices rose as the year progressed. Asian prices may have led the way but EU prices began to catch up by increasing at a faster pace. Steel pricing rose progressively over 2004-2008. Thereafter, with lower steel prices and little scope for labour cost increases, steelwork cost was expected to drop. Initially prices held up but subsequently were eroded. Ship owners looking to minimize repair work during lean periods may have been a factor. In 2011, low steelwork prices were quoted by Chinese ship repair yards. However, the position looks unsustainable.

**Paints and coatings work**
Recent years have seen ship owners faced with choices between traditional oil based paints and new generation products. The key factor is the potential cost of raw materials since 2009. Oil prices have soared. Copper, zinc and aluminium prices have remained high and still seem to be increasing. Many other related inputs such as packaging increased dramatically in 2010. In 2011, coatings manufacturers increased prices to consumers. Over the long term the concern shall be with environmental regulations. The banning of TBT-based products showed that major changes can be brought in swift and comprehensively. Some government agencies have expressed concerns over copper based products and biocides found in anti-fouling paints.

**Spares**
The spares market has remained stable. However, the downturn in the newbuilding market may cause from original equipment manufacturers (OEMs) to begin production cut backs. The result of cut backs may lead to a return of pirated parts. Ship owners and managers will need
to be aware of low priced offers from non-OEM or licensed sources. New requirements for emissions and ballast water management are set to add to ship operation’s technical and administration costs and are areas of evolving technology, which will have implications for spares in the future.

**Currency exchange rates**

For ship owners and managers, ship repair is usually a dollar based transaction. However, an exception may be made for domestic transactions and yards dealing in domestic currency. For some ship repair companies almost all foreign dry-dock transactions are quoted and paid for in US currency. Consequently, exchange rate adjustments, the impact of inflation, changes in currency values can all affect ship repair costs and prices. In addition, political control of currency values in other countries can also affect ship repair competition. In this respect, China has often been accused of the under valuation of the yuan. Finally, currency volatility and weaknesses in currency trades can result in pricing instability in the ship repair industry.

**Americas and Caribbean ship repair facilities**

New World Shipyards reports that there are the following 10 large dry docks in the region:

1. Panama/ Central America: (318 x 39 x 8) (length x beam x depth in metres)
2. Rio de Janeiro/ Brazil: (400 x 73 x 12)
3. Brooklyn, New York/ USA: (333 x 46 x 11)
4. Norfolk, Virginia/ USA: (300 x 50 x 12)
5. Newport News, Virginia/USA: (662 x 76 x 9)
6. Philadelphia, USA: (300 x 34.8 x 10.7)
7. Roslindale, Maryland/USA: (366 x 61 x 8.5)
8. Bayonne, New Jersey/USA: (333 x 45 x 11)
9. Boston, Massachusetts/USA: (350 x 38 x 12)
10. Freeport, Bahamas/Caribbean: (300 x 54 x 10)

**Main Latin American and Caribbean ship repair facilities**

The main ship repair locations in the Caribbean are shown in Figure 10-11. With the exception of Cuba, which has a facility capable of accommodating vessels of 65,000 dwt, the rest of the Caribbean can only accommodate vessels between 20,000 and 23,000 dwt. Consequently, it can be concluded that the with the exception of the Bahamas, which caters to the Cruise Ship market, the rest of the English speaking Caribbean region does not have the ship repair capacity to accommodate vessels greater than 23,000 dwt.
Caribbean ship repair facilities

**Figure 10-12** shows a profile of ship repair companies operating in the Caribbean region in 2006. In particular, in Trinidad there are now five (5) small ship repair companies- CL Marine Limited (CARIDOC), Maritime Preservation Limited, Austal, Inter Isle Construction and Fabrication Limited, and Mariner’s Haven Limited. Most of the facilities are located in the Chaguaramas area. The CARIDOC facility located is now outfitted with a 23,000 dwt floating dock facility acquired in 2007.

<table>
<thead>
<tr>
<th>Facility</th>
<th>Capacity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trinidad</td>
<td></td>
</tr>
<tr>
<td>Inter-isle</td>
<td>700 tonnes</td>
</tr>
<tr>
<td>Maritime Preservation</td>
<td>1,600 tonnes</td>
</tr>
<tr>
<td>Mariner’s Haven (graving dock)</td>
<td>5000 tonnes (281 feet long by 56 feet wide)</td>
</tr>
<tr>
<td>Grand Bahama Shipyard</td>
<td></td>
</tr>
<tr>
<td>Dock 1 (floating dock)</td>
<td>30,000 tonnes lifting capacity (Panamax size vessels)</td>
</tr>
<tr>
<td>Dock 2 (floating dock)</td>
<td>82,500 tonnes lifting capacity (VLCCs of up to 250,000dwt)</td>
</tr>
<tr>
<td>Curacao Dry Dock Company</td>
<td></td>
</tr>
<tr>
<td>Antilla Dock (graving dock)</td>
<td>150,000 dwt</td>
</tr>
<tr>
<td>Beatrix Dock (graving dock)</td>
<td>28,000 dwt</td>
</tr>
<tr>
<td>Curacao Dock (floating dock)</td>
<td>10,000 tonnes lifting capacity</td>
</tr>
<tr>
<td>Martinique</td>
<td>5,000 tonnes</td>
</tr>
<tr>
<td>St. Vincent</td>
<td>1,500 tonnes</td>
</tr>
</tbody>
</table>
**Ship Repair Market in Trinidad**

Trinidad and Tobago is located within close to proximity to major global shipping lanes having approximately 31,000 voyages pass within 25 nautical miles of Trinidad and Tobago on their way to the United States of America or the Panama Canal. The Panama Canal is located 2,200 kilometers away from Trinidad and Tobago, which it a viable option for ship owners to consider Trinidad in the selection of a location for the performance of ship repair services.

With the planned expansion of the Panama Canal due for completion in 2015, there is a high probability that the larger size new Panamax vessels will result an increase in the vessel traffic and market opportunities for the ship repair industry in the largest size category of vessels greater than 200,000 dwt. These market opportunities are quite possible in the following market segments:

- The largest size general cargo and container ships with a TEU capacity of 13,000 units and measuring between 320-350 metres length overall (loa) x 50- 59 metres beam and drafting between 14-16 metres.
- Dry bulk cargo carriers transporting iron ore between Brazil and China with transshipment operations currently based offshore at Point Lisas.
- Dry bulk cargo carriers transporting iron ore and steel product at Point Lisas.
- Dry bulk cargo carriers transporting bulk grain and pulses at Port of Spain and Point Lisas.
- The VLCC oil tanker market for vessels taking crude oil and refined oil at Galeota and Pointe a Pierre.
- The specialized product, LNG and LPG gas and petro chemical carrier market for vessels taking specialized product at Point Lisas.

**Opportunities for Growth and Development**

**Private Sector Investment in Infrastructure**

At present there is a private sector proposal for the development of a ship repair dry-dock outfitted with three large size dry-docks comprising two (2) 400 meter and one 500 meter dock capable of handling the largest new Panamax vessels. The proposal is designed to service the VLCCs, ULCCs and VLCS, which are currently serviced by two (2) other commercial docks in the Americas region. The proposal noted that the price of commercial services in the USA for repair and maintenance is 40-50% higher than their counterparts in the Asian markets with labor costs typically accounting for 70% of total costs. This has resulted in a steady decline in the demand for ship repair and maintenance services in the USA over the past 25 years.

Consequently, the proposal concludes that no viable competition exists in the Americas compared to their Asian counterparts both from the perspective of price and size of ship repair facility.
Consequently, New World Shipyards proposes to fill the gap by offering services that can cater to the large and very large ship sizes as well as compete from a pricing perspective due to lower labor costs and lower energy costs as benchmarks to global price levels.

**Conclusion for the Ship Repair Sector**

This report has conducted an extensive review of the global shipping and ship repair markets. While shipping has experienced a decline following the financial crisis of 2008 and there has been a time lagged decline in shipbuilding and ship repair activity the most recent data and daily reports from Hellenic News suggests that the global shipping market is in the recovery stage of the shipping cycle and the prospects for recovery and moderate growth in the major economies and the seaborne trades look good. However, cautious optimism is advised.

The investment in infrastructure in the Panama Canal due for completion in 2015 will no doubt create market opportunities for the shipping and the ship repair industry. Consequently, the development of ship repair infrastructure should be seriously studied by industry experts who should develop demand forecasts and conduct financial feasibility assessments. In this respect government would be well advised to consider the development of ship repair infrastructure using the Public Private Sector model to have the business risks assumed by the private sector.

**10.2. Opportunities for Growth of the Yachting and Marina Sector**

In this study we review the Caribbean travel and tourism economy and yachting product market in Trinidad excluding Tobago, which is not currently a market for the yachting and marina subsector. We also review the economic impact of yachting on the economy, employment and the investment in infrastructure and assess the opportunities and prospects for growth and development of the subsector.

The definitions used in this study are those provided by the Economic Commission for Latin American and the Caribbean (ECLAC, 2002, 2004 and 2013), which are used in related Strategic Planning studies under reference. However definitional challenges remain. There remains a need to formalize and standardize the definitions as already some countries have begun to change policies and legislation. Furthermore definitions also form the basis of measurement, information and management systems. For example, there is little or no evidence that yachting tourists are measured in the same way in all countries. In fact, in at least two countries yachting tourists are not measured at all because they are considered crew.

Throughout the region, the yachting sector is referred to by a variety of names, all of which essentially denote a similar product. Alternative names include the yachting industry and the pleasure - or leisure boat industry or sector. Recreational boating is another concept, which at times is used interchangeably with pleasure boating or yachting. In fact, recreational boating and pleasure boating are wider concepts, as these would also include sailing dinghies and other boats, which are not normally considered yachts. In the Caribbean it could also include
pirogues and other similar craft that are used for recreation, semi-professional fishing, and dive and whale watching vessels.

In the context of this study we will define a yacht as a seaworthy vessel in excess of five meters, propelled by motor or sail and categorized a private or charter vessel, mostly used for pleasure.

A cruising yacht is a yacht typically used by its owner for various periods of time. A live aboard is a cruising yacht occupied by its owner on an almost permanent basis.

In the same context we will define a super or mega yacht as a yacht over 30 meters. At times the boundaries between the larger yachts and small cruise ships, particularly those special purpose vessels such as dive charter boats or the sailing of “traditional” vessels, may be blurred.

An upper limit therefore for a yacht would be a vessel that does not fall under the International Maritime Organization (IMO) definitions, under the International Convention for the Safety of Life at Sea (SOLAS) or the International Code for the Security of Ships and Port Facilities (ISPS). Vessels that comply with those definitions should be considered cruise ships. This may need some further thought to ensure that the larger mega and super yachts or day charter boats would not be classified as cruise ships.

A bareboat yacht is a yacht rented without a paid crew for a fixed period of time. A crewed charter boat is a yacht rented for a fixed period of time whereby the crew is responsible for all aspects of the sailing experience. Crewed charter boats may be operated as resident or non-resident business: sport fishing, diving and glass bottom boats. Crewed yachts tend to be larger than bareboat or cruisers and carry a crew of two people and upwards. They can include mega-yachts and day-sailing yachts.

A marina is any facility that provides wet storage, including moorings, for 10 or more yachts, and offers bathroom, shower and change facilities and receptacles for the disposal of waste. A boat yard is a facility providing a lifting capability of a minimum of 10 tons and land storage and services to marine craft.

The yachting sector, or pleasure boat industry, is defined as the complex of activities that are required to sustain charter boating and cruising in the Eastern Caribbean. It includes the "yachting" establishments as well as "tourist" establishments that are the direct recipients of the yachting tourist expenditures, as well as those establishments that provide goods and services to the "yachting" and "tourist" establishments.

A yachting tourist is defined as a person who stays for more than 24 hours but less than twelve months in a particular country outside his or her usual place of residence and whose place of stay is a vessel for most of their stay (reference World Tourism Organization (WTO) definition of tourist).

Yachting establishments are those enterprises that cater uniquely or mostly to yachtsmen and include charter boat companies, marinas, boat yards, moorings and ancillary marine
services, such as sail-making, engine repair, marine electronics and out-haul facilities, marine equipment supply shops and chandlers. The distinction between direct and indirect recipients can be blurred. Many yachting establishments, such as marinas and ancillary services, provide goods and services directly to yachtsmen, as well as to other yachting establishments such as charter boat companies and further confounding the problem to non-yachting residents and other tourists as well. For example, establishments now catering to the marine sector may be dependent on fishermen and income derived from yachting may only constitute a minor portion of their income.

Tourist establishments are those enterprises that provide goods and services mainly to tourists in general such as communication service providers, taxi drivers, car rentals, travel agents, banks, restaurants, supermarkets, tour operators as well as entertainment.

A mooring is an anchoring device permanently in position on the seabed, attached by ropes or chains to a floating buoy. The type of anchoring device used depends on the nature of the sea bottom and the type of vessel for which it is intended.

Skilled workers and repair services include shipwrights, chandlers, mechanics, electricians, plumbers, painters, riggers and sail makers.

Yachting events include regattas and sailing events.

**Caribbean Tourism Economy and Market**

**Definitions**

The definitions used in this section of the study are taken from the World Travel and Tourism Council Economic Impact Research.

Travel & Tourism – relates to the activity of travellers on trips outside their usual environment with for less than one year. Economic activity related to all aspects of such trips is measured within the research.

Direct contribution to GDP is the GDP generated by industries that deal directly with tourists, including hotels, travel agents, airlines and other passenger transport services, as well as the activities of restaurant and leisure industries that deal directly with tourists. It is equivalent to total internal Travel & Tourism spending (see below) within a country less the purchases made by those industries (including imports).

Direct contribution to employment is the number of direct jobs within the Travel & Tourism industry.

Capital investment includes capital investment spending by all sectors directly involved in the Travel & Tourism industry. This also constitutes investment spending by other industries on specific tourism assets such as new visitor accommodation and passenger transport equipment, as well as restaurants and leisure facilities for specific tourism use.

Visitor exports are spending within the country by international tourists for both business and leisure trips, including spending on transport.
**Economic contribution**

Yachting is tourism (ECLAC 2002). Yachting belongs to the product mix in Caribbean travel and tourism, which is made of stay over visitors, cruise ship passengers and yacht passengers.

The Caribbean regional market consistently attracts roughly 3% of stay over visitors in the global tourism market each year over the past 40 years (WTO, 2011). While the sector was negatively affected by the global economic contraction between 2009 and 2010, it has shown resilience receiving 20.8 million stay over visitors in 2011 (UNWTO, 2012). It remains the world’s largest cruise destination, attracting up to 39.8% of all itineraries in 2011. The growth in cruise passengers has closely rivalled that of stay-over visitors amounting to US$20.6 million between 2010 and 2011 (Travel Weekly 2012).

The direct contribution of travel and tourism to the Gross Domestic Product (GDP) of Caribbean economies ranged was US$ 15.7 billion or 4.6% of GDP in 2012 and is forecast to increase by 3.2% per annum from 2013 to 2023 and reach US$22.4 billion in 2023 (in constant 2012 prices).

**Figure 10-13 Direct Contribution to GDP of Caribbean Economies**

The sector generated between 647,000 jobs or 3.9% of total jobs in 2012, which is expected to rise by 1.9% per annum to 813,000 jobs in 2023.
Investment in travel and tourism in 2012 was US$5.4 billion, or 11% of total investment, which is forecasted to increase by 3.7% per annum and reach US$8.1 billion or 11.8% of total investment in 2023 (WTTC 2013).

However, many Caribbean tourism destinations have been maturing over the years and the need for new public sector investment in order to secure long run competitiveness has been recognized in some countries.

**Economic Projections for the United States, Europe and the United Kingdom**

The Caribbean region has been able to use its proximity to the large North American source market (its largest single country market), the United Kingdom and Europe (its largest single regional market), the large number of close destinations, the environment and warm climate in the region in order to sustain annual growth rates of cruise passengers of over 7% since 1980 (FCCA 2012).

The International Monetary Fund World Economic Outlook projects growth in the economy of the United States of 2.8 percent in 2014, up from 1.9 percent in 2013. The euro area is also turning the corner from recession to recovery. Growth is projected to strengthen to 1 percent in 2014 and 1.4 percent in 2015, but the recovery will be uneven. The pickup will generally
be more modest in economies under stress, despite some upward revisions including Spain. Elsewhere in Europe, activity in the United Kingdom has been buoyed by easier credit conditions and increased confidence. Growth is expected to average 2½ percent in 2014–15, but economic slack will remain high (WEO 2014).

The economic projections for the economies of the USA, UK and the Euro areas, which are the major markets for Caribbean tourism, show signs of stability and recovery and there is the prospect of a return to moderate growth in the demand for travel and tourism in the Caribbean.

**Yachting as Tourism**

The yachting and pleasure boat industry was described as the second most important tourism component after land based tourism exceeding even cruise ship tourism in much of the Eastern Caribbean. However, it has been argued that the yachting subsector has remained largely unrecognized by national governments, regional and global institutions in the past (ECLAC 2002).

The Dutch funded project entitled NET/00/79 “Development of a Regional Marine-based Tourism Strategy” selected yachting as a subsector for study in the British Virgin Islands, St. Maarten, Antigua, and Barbuda, Saint Lucia, Saint Vincent and the Grenadines, Grenada and Trinidad and Tobago. In all the countries the studies were preceded by consultations with the private and public sector and following the completion of the national reports, the findings were similarly discussed via national, public and private consultations.

In a subsequent study entitled “Towards Diversification of the Tourism Sector- A Recreational Demand Study of Yachting and Marina Services in the Caribbean” (ECLAC 2013) a recreational demand model for yachting and marina services in the Caribbean examined the significance of certain variables, which influenced yachter’s decisions to visit the region for the purposes of engaging in nautical activities. The results of the study, subject to certain practical limitations and methodological constraints, concluded that high incomes along with the price of airline fuel, as a proxy for airline ticket cost and the passage of hurricanes and tropical storms were all significant factors, which influenced the demand for yachting and marina services. The study further noted the possible need for targeting of an even higher income market segment as part of the medium to long term development strategy for the sector.

The study also reviewed the marina sector in the Caribbean including the number of marinas and berths distributed in the Caribbean region from Cuba to the north to Aruba in the south, as part of the tourism services complex, which generates economic and social benefits for the Caribbean.

Because the model is based on a recreational demand analysis, it did not examine the supply side of public/private sector investment in the provision of infrastructure and facilities as a determinant of the demand for yachting and marina services.
However, arrival statistics provided for the period 2009 to 2011 for Saint Lucia and Antigua, respectively show that public/private investment in the modernization of tourism infrastructure, facilities and services may have responsible for an increase in the demand for yachting and marinas services (ECLAC 2013).

**Seasonality**

In the Caribbean the demand for yachting and marina services is also affected by seasonality of weather conditions and is therefore cyclical. In the Caribbean there are two seasons the wet and the dry seasons. The wet season, during which hurricane and tropical storms prevail, normally runs from June to November each year.

The seasonality of weather conditions affects yacht insurance policies for vessels cruising north of 12.40 degrees line of latitude, excluding Trinidad and Tobago and other south American countries, which lie south of the hurricane belt and are normally used as hurricane shelters.

In Trinidad, the seasonal demand for yachting and marina services extends from June to November each year and is therefore counter cyclical (ECLAC 2004).

**Yachting and Marina Product Differentiation in the Caribbean**

The development of the tourism product in the Eastern Caribbean region has resulted in the emergence of service economies, which have replaced the traditional agriculture sector as the major source of foreign exchange earnings (ECLAC 2013). Over the period the tourism product has matured and the product mix has evolved to include cruise ship tourism, home-porting yachting and marinas.

Over the years the smaller islands located to the north of the Caribbean endowed with the natural advantages of sun, sea, sand and beautiful beaches, but very little natural resources and population size, which lie in close proximity to the United States have been developed as markets for recreational, leisure marine, fishing, dive yachting, bare boat charters, crewed charters, cruise and day charters.

The two main charter boat destinations and cruising areas as the Virgin Islands (comprising the British Virgin Islands (BVI), the United States Virgin Islands (USVI) and the Puerto Rican outer islands) and the Grenadines- Grenada and St. Vincent and the Grenadines (ECLAC 2004). These areas are noted as the major destinations for bare boat charters, crewed charters and day charter tours.

The islands of Martinique and Guadeloupe are also popular destinations. Martinique and Saint Lucia are destinations for charter boat trips to the Grenadines. The latter is also the Caribbean destination with Antigua and Barbuda since 2003 of the Atlantic Rally for Cruisers (ARC), a popular cross-Atlantic sailing event.

St. Maarten and Antigua are service centres, which are also popular winter destinations (with St. Barths) for mega or super yachts. Antigua and Barbuda also offers more anchorages than any other Leeward island (Doyle).
Traditionally, Venezuela and Grenada have been used as hurricane shelter storage and repair and refit service centres. However, Venezuela has lost some of its market appeal as a destination due to political disturbances in the past decade and Grenada suffered major damage in 2004 to its yachting infrastructure and continues to rebuild its infrastructure and services. In addition, the cruising areas in the south of the Caribbean are not as well developed as those areas to the north.

Trinidad and Tobago is a gateway to the South American mainland and its close proximity to Venezuela, Guyana, French Guyana, Suriname and Brazil provides the locational advantage for the creation of a product mix related to yacht storage, repair, eco-tourism and exploration of the natural environment.

In Trinidad the demand for yacht storage, repair and refit services is counter cyclical and runs from June to November each year. The peak month of September contrasts with the lowest yacht arrivals in Antigua and Barbuda (ECLAC 2002). The yachting market is comprised of yachts kept in storage at boatyards for an average of five (5) months and transient live aboard cruisers, who stay on their boats for periods ranging between one (1) and six (6) months per year in order to conduct yacht repair and maintenance.

The yachting product is therefore identified with storage and light industrial repair and maintenance services and has production and cluster linkages with the light industrial and ship repair subsectors of the economy. Consequently, a distinction may be made between yachting as tourism located to the north and yachting and marina storage, repair and maintenance services as light industrial activity located to the south of the Caribbean.

**Anchorages and Marinas**

The same attractions that draw the tourist or the cruise ship visitor also attract the sailor. In addition, there are the isolated beaches, the cays and small islands and islets and the marine parks that provide safe natural anchorage within in the sheltered areas of the bay. The region’s geography facilitates easy passages between the islands adding to the multi-island same day experience.

Marinas are located throughout the region as they are an important base for charter boats, a temporary place of stay, an alternative to anchoring in bays or as a place for repair and refitting. Depending on purpose, marinas vary in terms of facilities offered.

On the one hand, there are the light industrial marinas and boatyards like those located along the Chaguaramas peninsula in Trinidad. On the other hand there are recreational marinas, which focus on the recreation/holiday experience and offer a wide range of facilities, often similar to those offered by up-scale hotels and resorts. The marinas in Simpson Bay are prime examples of those in the region. Many others such as those located in Antigua and Barbuda are in between.

Ownership varies between private sector local ownership (prevalent in Trinidad and Tobago) to foreign, with a few being managed by international marina management firms. An interesting tendency has been the gradual move toward local ownership in Tortola and Falmouth Harbour in Antigua.
Conceptually, marinas provide the space for live aboard cruisers to stay. In consequence their capacity ought to be added to accommodation supply of any particular country.

Indeed in Trinidad and Tobago in the 1990s and in St. Maarten since 1995 most of the increase in accommodation supply stems from expansion in marina berth capacity (ECLAC 2004).

**Clustering**

A distinction can be made in the Caribbean region between clusters and anchorages (ECLAC 2004). A cluster is a multitude of linked facilities, which can be distinguished from anchorages and moorings. The latter have either no services at all or the range is restricted, often limited to a bar or restaurant. If technical services are available they tend to be incidental to the main business. Portsmouth in Dominica is an example of this.

In between are the isolated marinas or yards, which have no major links to other establishments in close proximity. An interesting case is the Blue Lagoon - Indian Bay area in St. Vincent and the Grenadines, which possibly could be described as a semi cluster. Facilities are available but not necessarily within easy reach and scattered between other non-marine establishments and housing.

In contrast a single or group of marinas or yards dominates the clusters. These attract other dedicated yachting services such as sail making, engine repair, chandlers, etc., and later ancillary services such as supermarkets, banks internet cafes and so on, which service not only the yachting community but also service the (tourism) society at large. Eventually such spin-offs may reduce the relative importance of yachting, not unlike what happened to some traditional port cities. Rodney Bay may have undergone such a transition. In some countries clusters have been planned. Rodney Bay in Saint Lucia and Wickhams Cay in Tortola are two examples.

In others, Simpson Bay in St. Maarten, Chaguaramas in Trinidad and English - Falmouth Harbour area in Antigua, or somewhat smaller, such as Bequia in the Grenadines, clusters seem to have developed organically as a result of natural advantages government development plans and private sector initiatives and investment. Obviously the economic, social and environmental impacts of clusters differ from those of anchorages and moorings in that the former tend to generate longer stays, more revenue and inter industry linkages, more employment and more pollution per boat.

**The Trinidad and Tobago Tourism Economy and Market**

The direct contribution of Travel and Tourism to GDP was TT$6,817.7 million (4.4% of GDP). This is forecast to rise by 2.6% to TT$6,992.7 million in 2013. This primarily reflects the economic activity generated by industries such as hotels, travel agents, airlines, and other passenger transportation services (excluding commuter services. but it also includes for example, the activities of the restaurant and leisure industries directly supported by tourists. The direct contribution of Travel and Tourism to GDP is expected to grow to TT$9,558.4 million (4.1% of GDP by 2023 (WTTC 2013).
Travel and Tourism generated 38,000 jobs directly in 2012 (6.2% of total employment). This is forecast to remain the same in 2013 at 38,000 (6.1% of total employment). This includes hotels, travel agents, airlines, and other transportation services (excluding commuter services). It also includes for example, the activities of the restaurant and leisure activities directly supported by tourists. By 2023 Tourism and Travel will account for 41,000 jobs directly and increase of 0.8% per annum over the next 10 years.

Trinidad and Tobago is expected to have attracted capital investment of TT$1,440.9 million in 2012. This is expected to rise by 10.6% in 2013 and rise by 4.7% per annum over the next 10 years to TT$2516.6 million in 2023. Travel and Tourism’s share of national investment is expected to rise from 10.3% in 2013 to 10.7% in 2023.
In 2012 Trinidad and Tobago generated TT$4.913.9 million in visitor exports. In 2013 this is expected to grow by 2.8% and the country is expected to attract 440,000 visitor arrivals. By 2023 international tourist arrivals are expected to total 638,000 generating expenditure of TT$7,663.3 million an increase of 4.3% per annum.

The economic costs and benefits associated with the yachting and marina subsector include the following:

- Direct Expenditures by yachts
- Revenue generation
- Employment and job creation

The benefits derived from the yachting industry are related to the type of yachting tourist, the type of services offered by the destination and the available infrastructure and facilities.

The Yacht visitor can provide benefits, which result in greater benefit to the production and maritime cluster than other types of tourists. Studies conducted into yachting expenditure have concluded that the yachting industry contributed more to GDP than cruise ship
expenditure. In Trinidad, the average daily expenditure by yachting tourists is estimated to be US$35 per person per day, which is marginally lower than the expenditure of the average cruise ship passenger, which was estimated at US$40 per person per day. However, the average length of stay of the yachting passenger (98 days) tended to be longer than that of the cruise ship passenger (1 day). Therefore the total yachting expenditure per stay tended to be greater than that of the cruise ship passenger.

The average daily expenditure does not include expenditure on yacht repair. The average 40 foot yacht spends an estimated budgeted minimum of TT$120,000 on repairs and upgrades per annum. In 2000, over 3,000 yachts visited Trinidad. Retail sales were estimated at TT$45 million or an average of TT$15,000 per boat, equivalent to 13% of the budget (YIT 2005).

The economic impact of the yachting tourist in relation to the purchase of goods and services may be reviewed as follows:

- **Direct**
- **Indirect**
- **Induced**

Direct impacts relate to those impacts with respect to establishments that are direct recipients of the yachting expenditure such as marinas, sail makers, bars and restaurants.

Indirect impacts relate to the purchase of goods and services by those establishments that are in direct recipients of the yachting expenditures.

Induced impacts relate to the purchase of goods and services by those persons, who have received income derived from yachting expenditures.

The total expenditures by yacht tourists + expenditures on yachting related activities by non-yachting tourists (e.g. day charters) + yachting expenditures by local residents should be matched by the direct revenues of the yachting subsector. However, yachting establishments also purchase goods and services from each other (for example, a sub-contractor may purchase goods from a chandler or conduct financial transactions with the nearby banks).

Yachting Sector Receipts = Direct Purchases + Indirect Purchases + (Induced Purchases)

Insight into the structure of the yachting subsector is required to estimate its contribution to GDP. In a large number of studies yachting or tourism expenditures are directly attributed to GDP as a direct impact. However, intermediate consumption has to be deducted.

Yachting is not recognized as a sector in National Income Accounting or the industrial classification of activities. However, yachting expenditure, even more than land based tourism, is spread over a wide range of sectors. Therefore the actual contribution of yachting is complicated and the cost structures of each of the different subsectors have to be estimated.

In 1991, the Central Statistical Office sampled 91 establishments associated with the yachting subsector, of which 51 firms responded. The domestic subsector was not included.
Based on revisions made by ECLAC, which adjusted for certain observations made in estimation process, the revised estimate of expenditure for the yachting subsector was reported to be between TT$ 129-TT$150 million (US$21-US$25 million) and the direct and indirect contribution to GDP was estimated to be between TT$99-TT$120 million (US$17-US$20 million. Most of the expenditures are generated in Trinidad because there is a lack of infrastructure and expenditure in the yachting and marina subsector in Tobago (ECLAC 2002).

**Employment Generation**

The yachting and marina subsector depends on a range and mix of highly skilled, semi-skilled and unskilled labour in the production mix. Technical and vocational trade skills are required in the areas of boat building, propeller repairs, mechanical, welding, electrical, electronics, refrigeration, air conditioning, painting, fiberglass, woodworking, rigging, sail repair, upholstering, fairing and paint preparation, grit blasting, under-keel scraping and pressure washing, antifouling and carpet cleaning.

**Figure 10-20** shows the number, range and mix of repair and refit services available in Trinidad in 2002. At that time, there were 111 yachting establishments and employment generation in the yachting and marina subsector accounted for 976 full time jobs and 100 part time jobs (ECLAC 2002).

**Figure 10-20. Examples of the range of available services (Number of establishments in brackets)**

<table>
<thead>
<tr>
<th>Service</th>
<th>Number of Establishments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Boat maintenance, services and cleaning (10)</td>
<td></td>
</tr>
<tr>
<td>Boat repair (5)</td>
<td></td>
</tr>
<tr>
<td>Chandlers (7)</td>
<td></td>
</tr>
<tr>
<td>Electrical equipment (11)</td>
<td></td>
</tr>
<tr>
<td>Electronic equipment (7)</td>
<td></td>
</tr>
<tr>
<td>Engines, diesels (5)</td>
<td></td>
</tr>
<tr>
<td>Fibreglass (11)</td>
<td></td>
</tr>
<tr>
<td>Machine shops and metal fabrication (4)</td>
<td></td>
</tr>
<tr>
<td>Marine mechanics (3)</td>
<td></td>
</tr>
<tr>
<td>Osmosis repair (1)</td>
<td></td>
</tr>
<tr>
<td>Outboard engines (5)</td>
<td></td>
</tr>
<tr>
<td>Painting and refurbishing (5)</td>
<td></td>
</tr>
<tr>
<td>Propeller repairs and service (5)</td>
<td></td>
</tr>
<tr>
<td>Refrigeration and AC (7)</td>
<td></td>
</tr>
<tr>
<td>Rigging (7)</td>
<td></td>
</tr>
<tr>
<td>Sailmaking (5)</td>
<td></td>
</tr>
<tr>
<td>Welding (5)</td>
<td></td>
</tr>
<tr>
<td>Wood &amp; woodworking (6)</td>
<td></td>
</tr>
<tr>
<td>Yacht brokerage (2)</td>
<td></td>
</tr>
</tbody>
</table>

Source: Boaters enterprise

A training needs assessment conducted by the Yachting Steering Committee into the Yachting Industry Cluster in Trinidad and Tobago showed that 118 businesses are directly engaged in the Yachting sector with the majority supplying yacht repair and maintenance services, of which 84% can be described as micro and small businesses (YSC 2009).

The study noted that yacht repairs and maintenance, marina services and other services can be recognized as the three groups, which are engaged in the yachting subsector as follows:

- Repair and Maintenance Services (As above) - 64%
- Marina Services (Haul Out, Storage, Dock Space, Hospitality) - 19%
- Other Services (Retail Shops, Travel Agency, Brokerage) - 17%
The study further noted that the yachting cluster engages about 1,350 persons, who are employed in a wide range of occupations as show in Figure 10-21.

**Figure 10-21 Employment Distribution in the Yachting Industry by Functional Area**

The most significant services in order of importance are hospitality, hull repair and maintenance, preparation and painting, mooring and anchorage, cleaning and refurbishment, electrical and mechanical repair and haul out services.

In 2012, the National Training Agency in partnership with the Yachting Steering Committee (YSC) of the Business Development Company (BDC) conducted a Yachting Sector Survey in order to develop an understanding of labour market conditions and training needs of the sector.

The study concluded that the Yachting sector provided tangible benefits to the economy, which included direct expenditure, employment and job creation and revenue generation and that the sector contributes to the economy in much the same way that traditional tourism sector contributes to the economy in the areas of destination attractions, restaurants and accommodation and strategies have been recommended to meet the requirements for training and development of the human resources in the yachting and marina subsector.

**The Rise and Fall of Yachting and Marina Infrastructure in Trinidad**

Trinidad and Tobago’s entry into the tourism market has been recent in relation to the rest of the Caribbean, which has been involved in the development of the tourism sector since the 1960s.

The emergence of the cruise tourism and yachting subsectors during the decade of the 1990s must be seen against the backdrop of declining petroleum and petrochemical
revenues in the 1980s and attempts made by the public and private sector to re-tool and enter the non-traditional areas of economic activity and foreign exchange earnings following the implementation of structural adjustment and trade liberalization policies aimed at diversifying the economy.

Because the national economy exhibits all the classic signs of an open petroleum (and gas) economy, the dual economy persists in which there is competition for the allocation of scarce economic resources including the institutional capacity for growth and diversification. In other words, growth in the energy sector of the economy tends to crowd out growth and development of other sectors and subsectors in the economy. On the other hand declines in the energy sector, which are usually precipitated by dramatic changes in the international price of oil provide opportunities for diversification and growth of the other sectors in the economy.

In 1991, the small domestic yachting community located along Chaguaramas on the north western peninsula experienced a rapid expansion in infrastructure, facilities and services when Powerboats commissioned a 50 ton travel lift and boat yard with a storage capacity for 45 yachts with an average length of 15 meters. This development was soon followed by a further expansion of facilities and services when Peake Yacht Services entered the heavy lift yacht haul-out market by commissioned into service a 150 ton and a 70 ton travel lift in 1994. In 1996, Caribbean Yachtworks, a subsidiary of Crews Inn entered the market with a 220 ton travel lift and boat yard storage capacity of 65 yachts.

The dramatic increase in the demand for yachting and marina services in relation to available infrastructure, facilities and services in 1990s and early 2000s resulted in a shift in resources away from traditional hospitality services into the yacht repair services.

Many of the boatyards provided storage space with minimal management experience, supervision and project management skills used to deliver. Short term contract and temporary employees and independent third party contractors to employed to perform repair and maintenance services often with limited results in terms of consistency of quality and services.

In recognition of the growth potential of the yachting industry the Ministry of Trade, Industry and Commerce appointed a Committee in 1993 to make recommendations for the development of the visiting pleasure craft industry. Subsequently, TIDCO (now rebranded as the Tourism Development Company), a state enterprise, was mandated to develop the tourism product.

In 1994, the Yacht Services Association of Trinidad and Tobago (YSATT) a private non-profit industry organization was established by the boat yards and marinas within the western peninsula to provide services to its membership including data collation and information dissemination, events promotion and conflict mediation services between customers and suppliers.

In Government’s Medium Term Policy Framework (1997- 1999) the tourism sector and cruise tourism subsector were identified for the development with a view to the establishment of
cruise ship home-port facilities including the enhancement of yachting and marina infrastructure.

**Figure 10-22** shows that over the period 1990 to 2000 yacht arrivals increased significantly from 637 to 2,564. The explanations given for the dramatic increase relate to the use of Trinidad as a hurricane shelter and the then prevailing low cost for storage, repair and maintenance services.

**Figure 10-22. Number of Yacht Arrivals in Trinidad and Tobago**

![Graph showing the number of yacht arrivals in Trinidad and Tobago from 1990 to 2014.](image)

Source: Customs and Excise Division

Various explanations have been given for the persistent decline in arrivals experienced since 2000, which include international conditions, two major oil spills reported in the Chaguaramas area in 2000 and 2002 in which at least 200 boats were affected for which minimal compensation was provided to boat owners and reports of environmental pollution of the bays, crime, poor customer service and poor quality of repair work and services (YIT 2005).

It must be noted that a lack of project management and supervision, trained manpower resources and dedicated infrastructure and facilities for preparation and paint jobs have been associated with hull painting jobs conducted in open air yard areas often resulted in poor quality of finishes and a demand for re-dos by the customers. In addition, late repair jobs and a lack of customer service helped to create low levels of satisfaction in the yacht repair industry (YIT 2005).

In response to the decline, the Yachting and Marina subsector converted their infrastructure and facilities to alternative land use related to the non-yachting domestic market related to the commercial and energy sectors.

**Figure 10-23** shows the changing profile of yacht storage and marina infrastructure and capacity.
T&T Opportunities and Challenges for other Maritime Facilities

**Figure 10-23 Capacity of Boatyards and Marinas**

<table>
<thead>
<tr>
<th>Yacht Establishment</th>
<th>Land Area (hectares)</th>
<th>No of Slips</th>
<th>Travel Lift Capacity (tonnes)</th>
<th>Storage Yard Capacity</th>
<th>Current Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>All Moorings</td>
<td>2.7</td>
<td>n.a.</td>
<td>n.a.</td>
<td>150</td>
<td>Open (Pirogues)</td>
</tr>
<tr>
<td>Coral Cove</td>
<td>40</td>
<td>40</td>
<td>60</td>
<td>75</td>
<td>Open</td>
</tr>
<tr>
<td>Crews Inn / Yachtworks</td>
<td>18.2</td>
<td>68</td>
<td>220</td>
<td>40</td>
<td>Conversion</td>
</tr>
<tr>
<td>Humming Bird</td>
<td>20</td>
<td>n.a.</td>
<td>-</td>
<td>-</td>
<td>Open</td>
</tr>
<tr>
<td>IMS Yacht Services</td>
<td>1.5</td>
<td>0</td>
<td>70</td>
<td>180</td>
<td>Conversion</td>
</tr>
<tr>
<td>Inter Isle Construction</td>
<td>0.5</td>
<td>20</td>
<td>n.a.</td>
<td>40</td>
<td>Open</td>
</tr>
<tr>
<td>Island Property Owners</td>
<td>1.5</td>
<td>-</td>
<td>-</td>
<td>150</td>
<td>Open (Pirogues)</td>
</tr>
<tr>
<td>La Soufriere Marine</td>
<td>0.5</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>Open (Pirogues)</td>
</tr>
<tr>
<td>Peake Yacht Services</td>
<td>6.0</td>
<td>22</td>
<td>150</td>
<td>350</td>
<td>Open</td>
</tr>
<tr>
<td>Powerboats</td>
<td>5.7</td>
<td>22</td>
<td>50</td>
<td>255</td>
<td>Open</td>
</tr>
<tr>
<td>San Fernando Yacht Club</td>
<td>2.5</td>
<td>18</td>
<td>slipway</td>
<td>40-50</td>
<td>Open (Pirogues)</td>
</tr>
<tr>
<td>Tardieu</td>
<td>0.2</td>
<td>6</td>
<td>-</td>
<td>-</td>
<td>Open</td>
</tr>
<tr>
<td>TT Sailing Association</td>
<td>0.7</td>
<td>115</td>
<td>15</td>
<td>32</td>
<td>Open</td>
</tr>
<tr>
<td>TT Yacht Club</td>
<td>1.0</td>
<td>94</td>
<td>n.a.</td>
<td>n.a.</td>
<td>Domestic</td>
</tr>
<tr>
<td>Tropical Marine</td>
<td>21</td>
<td>none</td>
<td>n.a.</td>
<td>Open</td>
<td></td>
</tr>
</tbody>
</table>

**Opportunities for Growth and Development of the Yachting and Marina Subsector**

Despite these setbacks, the Yachting Industry Team prepared a Strategic Plan for the Yachting Industry in Trinidad and Tobago, which was approved by Cabinet in 2005 designed to arrest the decline in the yachting and marina subsector.

However, the decline has continued up until the present. In 2010 yacht arrivals dropped to a low of 959. In 2011, there was a 7.4% increase to 1030 yacht arrivals. However, in 2012 there was a marginal decline of 1.5% in yacht arrivals to 1015 yachts. The marginal decline in yacht arrivals indicates that the decline has stabilized and restoration and growth strategies may be pursued.

**Figure 10-24 Yacht Arrivals in Trinidad**

![Yacht Arrivals in Trinidad](chart)
Indeed, in 2013 the Yachting Steering Committee (YSC) prepared a Policy and Strategic Plan for the years 2013-2015 entitled ‘Restoring Growth’, which identified stabilization and a return to growth as the highest priority for the yacht and marina subsector in Trinidad and Tobago (YSC 2013).

The Strategic Plan takes account of the decline in yacht arrivals and the lack of investment in the yachting and marina subsector. The Strategic Plan proposes various strategies to stabilize the decline and restore growth to the yachting and marina subsector, which includes institutional changes and the investment in yachting infrastructure.

The study noted that some progress has been made in the areas of institutional changes such as the adoption of the modified customs clearance form and non-Value Added Tax (VAT) for work done on transient yachts and the important role played by the Yacht Services Association of Trinidad and Tobago (YSATT) in pursuing the interests of the industry.

In particular, the Strategic Plan has concluded that there is little prospect of a sustained recovery unless the existing constraints related to a lack of yachting investment in infrastructure removed.

In addition, the Strategic Plan noted that there is a somewhat awkward role played by the Yacht Steering Committee (YSC) as an advisory body and not an implementation agency. The Strategic Plan goes on to note that yachting, like tourism, is multi-sectoral and the pursuance of a strategic plan involves the active involvement of many government agencies therefore a clear designation of executing agencies and support from the government ministries and agencies will be a sine qua non of successful implementation of its Strategic Plan.

It is not clear if the Strategic Plan has been approved by government and it is very unlikely that the YSC as an advisory body to government on matters of policy and planning may be called upon to project manage the implementation of approved capital investment projects. However, the issue of implementation of approved projects is an important issue, which must be addressed by the government.

If the yachting and marina product is defined as tourism then the implementation of approved government projects and plans of action should normally be the responsibility fall to the Tourism Development Company, which reports to the client Ministry of Tourism. However, if the yachting and marina product is defined as light industrial activity then the responsibility for implementation resides with the Chaguaramas Development Authority in which the lands located on the Chaguaramas area are legally vested.

**Conclusions for the Yachting and Marina Sector**

So what then are the economic prospects for the future growth development of the yachting and marina industry? We have seen that the direct contribution of travel and tourism to the Gross Domestic Product (GDP) of Caribbean economies ranged was US$ 15.7 billion or 4.6% of GDP in 2012 and is forecast to increase by 3.2% per annum from 2013 to 2023 and reach US$22.4 billion in 2023 (in constant 2012 prices).
Therefore, the prospects for a recovery and return to growth are good. However, there must be an investment in the development of yacht infrastructure and facilities in order to provide incentives for the realization of the full potential of the yachting and marina subsector.

## 10.3. Customs Reform and Trade Facilitation

### Objectives of Customs Reform

Customs services and the speed of customs procedures for the clearance of import and export consignments play a significant role in a country’s economic progress and development. Because Customs is the leading agency positioned at the borders and ports of entry/departure, it plays a prominent role in the release of goods. Streamlined and simplified customs processes and procedures have been proven to reduce transaction costs and provide additional benefits to the development of international trade. Transaction costs generated by customs procedures are significant barriers to trade; even higher than tariff costs. Consequently, improving customs clearance procedures increases efficiency by reducing the costs involved in international trade. (Mendoza 2013).

Research shows that the cost of border procedures may range from 2% to 15% globally of the value of traded goods (Ashton 2009). The concept of trade facilitation (TF) is therefore important as trade facilitation measures help to reduce trade transaction costs (Joosep 2014).

On average trade transaction costs amount to 10% of the value of the goods traded, which gets passed on to consumers. In particular, in developing countries, trade transaction costs incurred due to border procedures hamper business and economic growth. Trade facilitation can lead to lower prices, which increases consumers’ purchasing power and access to essential goods. Consumers gain as they do not need to pay for the extensive border delays. Faster border procedures enhance the delivery of goods to consumers; increase trade flows and lower costs, which in the end boost development. Increased trade efficiency triples the benefits for consumers (ICC 2013).

### Introduction of ASYCUDA World

The Government of Trinidad and Tobago, through the client Ministry of Finance and its state agency, the Customs and Excise Division (CED), has implemented the Customs reform and modernization programme. The project is based on the implementation of the UNCTAD Technical assistance project for the implementation of the Automated System for Customs Data- ASYCUDA World (AW), a computerized electronic data interchange (EDI) and management information system (MIS). The strategic objectives set for the reform and modernization of the Customs Compliance Management System is based on the achievement of the following:

1. Improvement in Voluntary Compliance
2. Increase in Revenue Collection
3. Facilitation of legitimate Trade
4. Reduction in the transaction costs of cargo clearance

The Customs and Excise Division (CED) has established a comprehensive compliance management strategy based on the following:

1. Risk Reduction
2. Achievement of measurable results
3. Coordinated border management

A performance monitoring and evaluation mechanism has been established based on the World Bank Customs Assessment Trade Toolkit Methodology, which is focused on the measurement of performance in four areas as follows:

1. Trade Facilitation: designed to make customs procedures simpler
2. Effectiveness: the achievement of reform objectives
3. Control: the enforcement of compliance with Customs laws
4. Efficiency: the achievement of cost effective results in document processing, inspection and release times

The AW technology and source code has been acquired free of charge by GOTT, excluding the UNCTAD technical assistance; the costs associated with the acquisition of Information Technology Infrastructure, work stations, computer hardware, software and peripherals, internet connectivity; the National Project team, the Customs Information Technology (IT) unit, the Customs Risk Management Unit; the training and development of customs personnel and stakeholders and the running costs to operate and maintain the AW system. The estimated cost of the project is as follows:

<table>
<thead>
<tr>
<th>Description</th>
<th>Cost (TT$)</th>
</tr>
</thead>
<tbody>
<tr>
<td>UNCTAD Technical Assistance</td>
<td>8.0 million</td>
</tr>
<tr>
<td>IT Technology Infrastructure</td>
<td>9.0 million</td>
</tr>
<tr>
<td>National Project Team</td>
<td>10.0 million</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>27.0 million</strong></td>
</tr>
</tbody>
</table>

The passage of an amendment to existing Customs Act Chapter 78:01 was first required in order to provide the legal basis for the use and control of EDI applications and information sharing under the reformed and modernized customs clearance system. The legislative process was initiated in 2009 and finally passed as an amendment to the Customs Act 6 of 2013, which authorized the use of the new AW system.

The system became operational in a pilot port of entry in December, 2010 and has been subsequently deployed and implemented at all ports of entry. This implementation and reform of Customs procedures and processes was conceived as Phase 1 of the Customs reform and modernization. Phase 1 of the project was completed at the end of 2012 and Phase 2 of the reform and modernization program was started in June 2013.

Phase 1 involved the installation of hardware and software, MIS and EDI systems at the seaports and the airports and customs inland offices. Internet connectivity and online
linkages were also established with other stakeholders in the system based on the Voluntary Compliance Program, which was operationalized using EDI ready selected users. Training workshops were conducted for internal customs users, external users, trade facilitation, including ‘training the trainer’ programs.

Phase 2 provides for interconnectivity and online linkages with TTBiz link, the Port Authority and PLIPDECO and other major stakeholders in the system, which will result in further integration of the multimodal and through transportation and logistics system.

The AW system is currently used at selected seaports, the airports and all inland offices. The implementation of ASYCUDA has played a significant role in simplifying customs clearance procedures without compromising customs controls. The implementation of the new automated system has removed the previous manual procedures, paper burden and redundant control mechanism.

The Central Statistical Office (CSO) and the Financial Intelligence Unit (FIU) are the two main entities, among others, that currently receive data from AW on a daily and monthly basis, respectively. The information contains all the necessary details about the items that are imported and exported and also taxes that are administered for each of these items. Customized data extractions and data formats were agreed to with these entities to facilitate an automated process of making data available for statistical analysis and decision support in economic and fiscal policy matters.

The implementation of AW has resulted in a comprehensive renovation of the information technology (IT) infrastructure increasing computerization to Customs and traders, facilitating the flow of legitimate trade and providing effective tools to sustain compliance.

AW allows 24/7 access, allowing carriers, shipping agents, NVOCCs, freight forwarders, customs brokers, consignee clerks, importers and exporters to lodge trade declarations electronically from their offices to the CED.

Customs clearance procedures have the following six essential steps:

1. Advanced cargo manifest report
2. Declaration lodged
3. Duties and taxes paid
4. Risk Assessment
5. Customs examination and Post Clearance Audits
6. Goods released

Once the cargo manifest has been submitted in advance to the CED, a goods declaration can be registered in AW for assessment and the payment of duties and taxes. The system assists declarants to calculate duty liabilities. Once payment of duties and taxes is satisfied the system assesses the level of risk to determine if a CED examination of the shipment is required. In so doing, AW’s selectivity engine reviews all built in criteria, traders’ past history and current workloads to evaluate risk levels. The system is also capable of determining if other trade related government agencies would require intervention. In areas such as the
Customs Examination Stations (CES) traders are able to make online appointments when shipments have been selected for physical inspections. There are two (2) Customs Examination Stations located at the seaports in Port of Spain and Point Lisas, respectively.

On completion of the CED’s intervention the custodian of the goods i.e. the Port Authority or Terminal Operator is notified that the consignee may take delivery of the cargo through the port’s normal cargo delivery and documentation process.

Most Customs formalities are automated requiring very little need for the use of hard-copy documents. However, in the Customs periphery there are other trade-related entities that have not reached a similar level of automation as the CED, hence preventing the trading community from experiencing complete trade facilitation. Some other government and state agencies such as the Chemistry, Food and Drug Division, the Bureau of Standards, the Plant Quarantine Division and the Port Health Division continue to rely on paper intensive processes and high levels of intervention without the use of computerized applications to assist in the streamlining of procedures.

After the implementation of AW the CED has observed the following successful outcomes:

- Reduced processing and clearance times
- Increased revenue collection
- Simplified procedures and processes
- Greater transparency and predictability
- Improved trade statistics
- Institutional capacity

**Trade Facilitation**

The AW system is available 24/7 and 7 days a week. Customs brokers, consignee clerks, importers and exporters and other users no longer need to wait to lodge a customs declaration and physically track the status of their entries at Customs House; they can do so electronically from their offices. Since AW became operational more than 2,000 users have been authorized by the CED to use the new system.

Declarations of commercial shipments by customs brokers and consignee clerks are processed using the new system. Low value non-commercial shipments by individuals are processed with the assistance of customs officers on site.

Between January and November, 2012 more than 212,000 declarations were processed using AW. A total of 148,000 or 70% of declarations made were related to imports of which 25,000 or 17% required the assistance of customs officers; the remaining 123,000 or 83% of declarations were processed by customs brokers and consignee clerks.

Since March 2012, the CED has introduced a self-assessment regime in which declarants are directly responsible for the completeness and accuracy of the goods declaration process when clearing shipments. Under the self-assessment regime the declarant submits all
supporting documents providing values, goods classification including the identification of the tax regimes applicable. AW then processes those details through its business rules and guides and assists declarants with the accurate calculation of duties and taxes.

One of the fundamental steps taken by developed countries in facilitating trade is the introduction of risk management in controlling and securing their borders. A blanket examination or non-risk based approach can significantly reduce efficiency of control measures and limit facilitation. At present roughly 70% of goods declared require some level of intervention of customs officers for inspection or documentary review. Inspections are conducted on site at the airports and seaports.

The AW system can be used to identify compliant importers/exporters and low risk commodities that could be released without being subject to physical examination as well as assist in the assignment of resources required to conduct examinations. The CED has established a Risk Management and Post Clearance Audit Unit for this purpose. Once the Unit has been fully staffed and operational the level of interventions is expected to be reduced.

**Effectiveness**

Customs duties remain a significant source of government revenue although this has declined as tariff rates dropped through multilateral, regional, and bilateral trade agreements. However, smuggling, under invoicing, incorrect classification and other types of fraud and errors can significantly undermine economic development and competitiveness. The CED continues to be a major contributor to government revenue especially when all duties, taxes and fees are collected. AW makes available comprehensive checks and balances to safeguard calculations.

The increase in revenue collection performance since the implementation of AW is remarkable having regard to changes introduced in taxation policies during 2012, which resulted in a reduction in taxes for imported goods.

**Figure 10-25** shows that for the period January to September 2012 there has been a sustained increase on average of about 10% in additional revenue, equivalent to TT$220 million collected for the year 2012 when compared to the same period for the year 2011.

**Figure 10-25 Import duties collected (Jan- Sept 2012 versus 2013)**
Figure 10-26 shows for the same period January to September 2012 compared to 2011, year on year, the additional revenue collected by the CED on behalf of the Licensing department for motor vehicles imported into the country increased by TT$60 million or 60%. Consequently, so too has the collection of Value Added Tax (VAT) over the same period.

The CED is now capable of detecting more non-compliance with less intervention. The burden of having routine controls and multiple filters and redundancies during the clearance process has been diminished or shifted to a post clearance control function.

**Efficiency**

Before the implementation of AW, the CED had approximately thirty (30) different steps and activities that had to be completed in order to grant clearance to imported goods. The project re-designed the customs clearance process by reducing unnecessary steps and minimizing requirements. Now the new clearance path concentrates its processes in six (6) steps where only two (2) steps require interaction with customs officers. Consequently, the time required to release goods has been drastically reduced. Moreover, it is no longer necessary to physically make trips back and forth to Customs House in order to track the status of customs entries lodged for processing.

As a result of the improved efficiency in the cargo clearance process, the turnaround time required to clear imported goods has now been reduced. A report generated from AW describes the time consumed between the moment the selectivity engine automatically assigns the level of risk and the time when a customs officer grants the release of the shipment.

Figure 10-27 shows the performance of the CED over a sample of commercial entries for the release of goods during 2012. The time taken by the CED to grant the release of cargo for clearance by consignees was reduced to 24 hours in 75% of the cases sampled.
Figure 10-27. Frequency distribution for the time taken to release commercial cargo for delivery to consignees

<table>
<thead>
<tr>
<th>TIME TO RELEASE</th>
<th>FREQUENCY</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;= 24 Hours</td>
<td>20,391</td>
<td>74.50%</td>
</tr>
<tr>
<td>&gt; 24 and &lt;= 48</td>
<td>618</td>
<td>2.26%</td>
</tr>
<tr>
<td>&gt;48 and &lt;= 72</td>
<td>556</td>
<td>2.03%</td>
</tr>
<tr>
<td>&gt; 72 Hours</td>
<td>5,804</td>
<td>21.21%</td>
</tr>
</tbody>
</table>

Source: UNCTAD 2013

The CED website facilitates different tracking tools which allow for transparency in operations and transactions throughout the entire process, from the moment the cargo manifest has been submitted to the CED until the shipment has been released to the consignee for delivery.

Under the new clearance procedures, importers can complete all customs formalities in advance before the arrival of the cargo shipments. Although the payment of duties and taxes can only be done at Customs House, the CED has introduced the facility of using a prepayment system. This means that shippers and the brokers or consignee clerks may use an on-line deposit account within AW to settle the duty liabilities without having to visit a customs office at regular working hours.

With the use of the prepayment accounts declarants only need to deposit in advance enough funds to have their payments processed at the time they self-assess their entries; once the account number and PIN are validated the system will draw down the assessed duties and taxes owed from the account. AW also provides the capability of interfacing with on-line banking applications provided that the commercial banks have the e-commerce infrastructure. Unfortunately, no commercial banks in Trinidad and Tobago have demonstrated an interest in making such facilities and services available to their customers.

Figure 10-28 shows the frequency with which on-line deposit accounts are used to make payments compared with regular walk-in cash transactions using the customs cashier service at Customs House. The figures are based on a sample of 27,369 goods declarations of a commercial nature that have obtained the release of goods. The frequency of transactions indicates that traders favour the use of cash transactions compared to on-line transactions using the deposit account service. The results may be related to the user transaction fee of TT$40 charged for on-line commercial transactions, the opportunity cost of using the deposit account compared with cash transactions or the commercial banks lack of interest in making the facility available to their clients and customers.
The improved cargo clearance process and consequent reduction in the cargo release time has also resulted in quicker access to cargo released for delivery to consignees. Consequently, this has resulted in a reduction in store rent and container demurrage charges paid by shippers for cargo held in storage at the ports beyond the normal free storage period granted for import and export shipments.

The administration and overtime costs associated with the customs declaration and cargo clearance processing have also been significantly reduced when figures for 2012 are compared with 2011. Figure 10-29 shows that for the customs overtime fees paid by shippers to expedite the assessment of declarations at the customs entry processing units was reduced by 20% for the period January to September, 2012 when compared to the previous year 2011.

Other fees that continue to be paid relate to the physical examination of cargo selected for examination at the Customs Examination Station (CES) and at the importers premises when inspections cannot be conducted at the CES.
**Compliance and Control**

The AW project also incorporates the introduction of the Post Clearance Audit (PCA) and the Voluntary Compliance Programme (VCP). Both programmes were designed to effectively work alongside the AW system to institute management compliance and control systems, which would operate in a cohesive and effective manner to minimize the uncertainty generated by the various risks involved in the cargo clearance and release process.

A Post Clearance Audit (PCA) policy was prepared to manage and minimize risk, which would adversely impact the CED’s objectives of facilitating trade, collection of revenues, border control and improved customer service to all stakeholders. The policy is aimed at ensuring maximum compliance with the relevant regulatory and legislative requirements by businesses that are subject to CED controls and a gradual reduction in the physical control and documentary examination of consignments.

The CED adopted the PCA and appointed customs officers to establish a Unit which will be expanded over time. An introductory training course was delivered to all staff of the unit, the functional team and other customs officers and further training is planned to complement the foundation training conducted.

The area of Risk Management and Post Clearance Audit are relatively new to the CED and it is important that this policy framework is fully embraced and utilized in order to effectively implement the initiatives of the PCA.

The PCA Policy also sets out the foundation for the development of a Voluntary Compliance Programme and an authorized Economic Operator Programme. However, the absence of an institutional client service charter, which clearly delineates the service delivery, does not provide the level of operational predictability clients expect from the CED. The lack of certainty has created various inconsistencies in the way customs officers carry out their functions and is perceived as being detrimental to the promotion of voluntary compliance.

Consequently, once all work plans and the institutional framework for the Risk Management and PCA policy is carefully, consistently and deliberately implemented it should go a long way in enhancing trade facilitation and fostering national economic development through collective responsibility.

As the PCA policy is effectively implemented and enhanced alongside the AW system the trade environment should benefit tremendously from the realization of reduced trade transaction costs, improved trade facilitation, stronger border security and increased revenue collection.

**Sustainability**

Infrastructure is fundamental to the reform process and an improved work environment is critical to improved and effective performance. Also traders and the general public need adequate infrastructure at all areas where they interface with customs officials. The improvements in infrastructure made during the life of the AW project were very limited and there is a need to secure more funding for future improvements and to maintain the existing improved conditions including an un-interrupted power supply, air conditioned areas, waiting rooms, public access computer centres etc.
The process of implementing AW has brought an important level of expertise and competence to the team that participated in the AW project, which guarantees long term sustainability. The staff in charge of managing and maintaining the technological infrastructure is proficient enough to maintain the level of availability required for this mission critical system. However, the resources need to keep abreast with technology and therefore training and development and specialization will continue to be demanded over time.

As a result the project proposed that the cost for operating and maintaining the AW Customs Border Control System (CBCS) be subject to the application of transaction fee or charge to customers using the system as a cost recovery mechanism designed to guarantee sustainability of the new system.

Transaction or computer fees are usually applied by many countries to recover costs related to customs modernization, including the computerization of procedures. This type of fee is reasonable provided it is strictly applied as a cost recovery mechanism to compensate for the introduction of automated procedures. The traders pay a fixed amount per transaction and the revenue is accumulated in a special account and used entirely for running costs, maintenance and upgrade of computer equipment as well as adequate staffing.

Cabinet has granted approval for the application of a transaction fee of TT$40 for commercial transactions and TT$10 for non-commercial transactions. The user fee was implemented in November, 2011 and collections have exceeded projections to date. However, it is important that the amounts collected are kept in a special account and strictly applied to the sustainable operation and maintenance of the AW system otherwise the effectiveness of the AW system will be compromised due to the lack of resources necessary to operate and maintain the system.

**Conclusion for Customs Reform and Trade Facilitation**

The CED reform and modernization project designed to improve the Customs Border Control System (CBCS) through the application of AW and the introduction of the Self-Assessment regime has changed the way the customs system operates. There is no doubt that the reformed operating procedures and post audit practices have improved the way the CED has traditionally performed its functions.

While important progress has been made to introduce a new working environment, change is always difficult to accept and the reform and modernization project did encounter internal resistance to change and challenges involved in moving away from the abusive old ways and system of overtime. However, good leadership has kept the Project Team motivated and the AW project on track.

Although AW is operational at all major ports of entry in Trinidad and Tobago, there continues to be operating procedures that remain under manual processing without suitable automation.
The lack of legislative amendments to facilitate the advance cargo reporting procedure has seriously affected the expected results of the project. However, significant improvements have been made in the following areas:

- The new process environment and tools provided to the trading community
- The improved turnaround time experienced in releasing shipments
- The level of revenue performance sustained over the last financial year
- The significant savings in administrative costs

Advanced cargo manifest reporting is critical in facilitating trade under a risk management approach. It will provide the necessary means to better secure the country’s borders; rationalize the level of customs intervention and, at the same time, allow for the implementation of pre-arrival clearance facilities. If this continues to be non-existent then effective trade facilitation will never be a reality in Trinidad and Tobago.

Most office accommodations and physical infrastructure throughout the CED are very inadequate and adverse to a conducive and productive environment. Only the Container Examination Station (CES) at Port of Spain and Point Lisas offer satisfactory accommodations and can be used for training. The other areas in which customs officers operate and those that offer contact with the general public require extensive improvements. Adequate office accommodation should take into consideration the requirements of the new process-flow, if one is to expect motivated staff and an improvement in service delivery.

The limited resources, which the CED has at its disposal has affected its ability to complete certain work and deliver additional benefits and results to the trading community at the management and operational level.

Additional resources are required to fully staff the Risk Management Unit. At present, the AW system is still using criteria recommended by the Risk Management Committee and the Project Team introduced during phase 1 of the project. However in phase 2 of AW project there should be a fully staffed Risk Management Unit as recommended in the approved policy and organizational structure.

Recent reports indicate that the CED is currently under-staffed by about 50% with 200 customs officers on duty when there is a manpower complement of 460 customs officers required.

The integration of the AW system with the Single Electronic Window (SEW) system will assist in further integrating the multimodal transport and logistics system. However, it is important that other peripheral government and state agencies involved in the customs clearance process are also automated and integrated with the AW system. These agencies include the Chemistry, Food and Drugs Division, the Bureau of Standards, the Plant Quarantine Division and the Port Health Division.

It is also important that other private sector institutions and organizations such as the commercial banks are also integrated with the AW system and begin to expand their
customer services to promote the use of the online deposit account system for the payment of customs assessments.

In addition to the implementation of the AW system the CED has also taken another important step forward to improve customs border control and security with the acquisition of the container/vehicle X-Ray inspection system.

In 2013, approval was granted by government for the procurement of a fixed re-locatable container/vehicle X-Ray inspection unit manufactured by NUCTECH in the People’s Republic of China and offered to GOTT under a non-repayable government grant facility of ¥ 40 million renminbi.

The model selected by the CED is based on a risk assessment and the recommendations made by United States Homeland Security and Border Control for use in Trinidad.

The model MB 1215 HS is a rail mounted fixed re-locatable container scanner, outfitted with a linear accelerator capable of penetrating 300 mm of dry steel container wall. The unit is powered by 6 MeV and can process 15 forty foot container units per hour. The unit is capable of image inspection, data management and storage and network communication. The operation and maintenance of the unit includes training of customs officers in use of the system and after sales service and maintenance in Trinidad.

The first unit was recently acquired and is due to be installed and commissioned at the West Gate exit of the Port Authority very shortly. Government also plans to acquire additional units for installation and operation at Point Lisas in the near future.

Finally, UNCTAD has indicated its commitment to continue to support and assist the CED to promote the development of greater efficiency in its system and operating process. However, the full support of the government is required in all areas in those peripheral state agencies, which do not have the necessary funding and support to computerize their respective operations in order interface with the AW system and derive the full benefits of trade facilitation and integration of the multi-modal transport system in international trade and the economy.

### 10.4. Labor Issues and Challenges

#### Industrial Relations at the two major seaports

Under the Industrial Relations Act chapter 88:01 Act 23 of 1972, the Seamen and Waterfront Workers (SWWTU) is the recognized majority trade union and bargaining body responsible for the negotiation of collective agreements at the two major general cargo ports- the Port Authority of Trinidad and Tobago (PATT) and the Point Lisas Industrial Port Development Corporation (PLIPDECO), respectively.

The Public Service Association is also responsible for the representation of a minority of Port Authority employees primarily employed in head office administrative functions. The senior managers of the Port Authority are represented by the Senior Management Association.
Industrial Relations, Health and Safety, Performance and Productivity

At present container handling port performance is poor at both ports due to problems of congestion, equipment serviceability and worker productivity. Berth utilization exceeds 80-85% of available capacity at both ports, which indicates severe port congestion and the requirement for the expansion of marine and port infrastructure. Equipment serviceability ranges from 90-95% for ship to shore cranes and 70-75% for the rubber tyred gantry cranes, which indicates poor productivity in the container terminal storage, receipt and delivery function.

Worker performance is poor in important areas related to the organization of work, occupational health and safety, cargo handling techniques, equipment maintenance and the cost of operations, which is directly related to the institutional structure of port operations, work hours and overtime, restrictive work practices and training and development of port workers.

At the ship to shore container handling rate ranges between 13-15 container moves per crane hour and at PLIPDECO the rate is similarly poor at between 14-15 moves per crane hour. The international industry standard for similar type container handling equipment is 20-25 moves per crane hour. Consequently, a significant improvement is required at both ports.

Port Authority of Trinidad and Tobago

Organization and Management of Industrial relations at PATT

The Port of Port of Spain is owned and operated by the Port Authority of Trinidad and Tobago on behalf of its client line Ministry of Works. Consequently, all of the operations of PATT cargo and inter-island ferry services are funded by the central government.

In 2003, PATT initiated its organizational restructuring process with the objective of transforming the administrative structure of its operations from the Statutory Authority/State agency approach to a commercially oriented management structure based on the creation of strategic business units. Consequently, PATT was separated into a governing unit responsible for port administration and a number of business units responsible for the management of the port functions, as follows:

- **POSINCO**: the landholding entity responsible for the property management function of the Authority’s 151 acres of land and harbor areas- owned, occupied or leased and extending from Reservoir Road, East Sea Lots to the Maraval River in the Port of Spain west area.

- **POS**: the cargo handling operations entity responsible for the management of the port’s general cargo handling services (conventional and containerized) located on 42 acres of port lands at King’s Wharf extension area.

- **TTIT**: the inter-island ferry service entity responsible for the management of the port agency agreement for the inter-island cargo and passenger ferry service located on 6.26 acres of lands at Queen’s wharf and the St. Vincent street jetty area.
T&T Opportunities and Challenges for other Maritime Facilities

However, the transformation plan, which has been in operation for more than 10 years now, has not achieved the full objectives of efficiency, accountability and profitability intended when the re-structuring process first began with the creation of the strategic business units in 2003.

It is also not clear whether the Port Authority Act Chapter 51:01 has been repealed and amended in order to provide the legal basis for the functioning of the business units.

Reports indicate the members of the Board of PATT also sit on the Boards of the business units, which is an inherently weak institutional arrangement relative to issues of accountability and efficiency in performance.

This is not the first time that such an untenable situation has occurred at the Port Authority. In 1978, the Gregoire Commission of Enquiry was appointed to examine the conduct of the Port Authority in relation to the operations of the former Port Contractors Limited, a private landing company established to perform cargo handling operations at the port, which went into bankruptcy and liquidation in 1978. The Commission concluded that a ‘massa cow and massa bull’ situation had developed in the relationship between both entities in which the directors of the Port Authority were also the directors of Port Contractors Limited. The relationship resulted in a lack of accountability, performance and profitability in port operations.

**The collective bargaining process at PATT**

At present, the respective business units are responsible for the day to day management of the terms and conditions of employment, which includes recommendations and proposals for improvements in the conduct of safe, efficient and productive work practices. The PATT GU and Human Resources and Industrial Relations Division in collaboration with the respective business units are responsible for the review, costing and conduct of contract negotiations.

The collective bargaining process is administered by the Chief Executive officer of PATT, who is responsible for executive management under the policy direction of the Board, and the general direction of the line Minister at the Ministry of Works.

The line Ministry of Works in consultation with the office of the Chief Personnel Officer (CPO) is responsible for setting the guidelines for negotiations, benchmarks and counter-proposals for wages and salaries and related terms and conditions of employment. Industrial disputes are normally referred for conciliation or the Industrial Court for dispute resolution. The collective bargaining process is a lengthy one, which contributes to significant delays in the public sector.

**Status of Collective Agreements for PATT**

The current status of collective agreements is, as follows:

- **Outstanding Collective Agreement (2005- 2008):** Wages and Salaries were agreed and implemented. However, there was no agreement on the proposal for an increase in retirement gratuity benefits, which is currently based on twenty (20) days to an enhanced retirement gratuity payment based on the existing severance formula of three (3) weeks for five (5) years or more service under the Retrenchment and Severance Benefits Act 32.
of 1985. The Union has argued that it is unfair for an employee, who has completed his full service, to be paid less gratuity benefits than an employee, who has left the service early under severance benefits.

- **Outstanding Collective Agreement (2008-2011):** Wages and salaries were agreed and implemented. However, there was no agreement on the enhancement of gratuity (as above) and the re-classification of certain categories of PATT and former Port Contractors Limited employees who perform the same clerical functions. Consequently, the Union has not executed the collective agreement.

- **Collective Agreement (2011-2013):** The current collective agreement expires on 31st July, 2013 and is will become due for re-negotiation for the period 2013-2015.

- **The union has noted that collective bargaining meetings have not been held between the management and the union for the last five (5) years.**

**Contract issues affecting port productivity and performance at PATT**

A number of contract issues, which affect productivity and performance have been identified, as follows:

- **Age of the labour force:** The aging profile of the labour force has had a negative impact on productivity in port operations. Quite a number of employees are between the ages of 58 and 64 and can no longer work the graveyard shift and face the uncertainty of crime in the city after normal working hours. Consequently, these workers would like to retire from service at the age of 60 years with their full pension benefits.

- **Training and development:** The lack of a sustained skills training programme for the operation of the container lifting equipment has also affected productivity. The skills of the workers require upgrading to meet the challenges involved in operating the new container handling technology. In previous years, a joint trade union/management training committee was established for that purpose. The committee, which was chaired by a technical expert appointed from the industrial equipment safety and inspection industry, was responsible for the medical examination, selection, training, testing and certification and registration of all container heavy lifting equipment operators. This included training programmes for ship to shore, rubber tyred gantry and mobile harbour cranes, reach stackers and container lift equipment operators. This committee was disbanded by the management and it should be made to function once again.

- **Simulator Equipment Training:** A training simulator is required for the provision of training in ship to shore crane equipment operation at both ports. At present PLIPDECO trains its gantry crane operators in Jamaica.

- **Training Needs Analysis:** A national port training needs analysis should be conducted by the National Training Agency, which should also take account of the legal requirements of the Licensing Authority and the Occupational Health and Safety Act for the operation of the heavy container handling equipment at both ports.

- **Worker Registration:** Quite a number of stevedore tally clerks and casual clerks, who have been employed in the industry for 20-25 years remain outside the registration
system for permanent employment benefits. This situation should be addressed through the Human Resources Division and the Sub-registration committee.

- **Flexi-hours of operation:** The management has proposed that workers should operate on flexi time, under which they may be called out to work on the basis of the ship arrival and departure times. However, the union has maintained that such a system is exploitative and therefore it is not in agreement with the proposal made.

- **Multi-tasking of stevedores and longshoremen:** The management has proposed that the ship to shore port workers be multi-tasked to perform all functional ship to shore functions which would now include the performance of linesmen in the berthing and unberthing of vessels, shipboard container lashing and unlashning, and longshore quayside functions under the ship to shore cranes. The union has not agreed with the proposal.

- **Payment for overtime work:** The management has proposed that overtime earnings should only be applicable after the completion of the 40 hour work week has been completed. However, the Union is of the view that the management approach will result in workers being engaged in some cases, beyond the normal 8 hour shift period to work double shift or 16 hours at straight time, which is contrary to the provisions of the Occupational Health and Safety Act and the Industrial Relations Act.

- **5 in 7 day work week at straight time rates of pay:** The management has proposed that the current 3 shift system 5 days per week, which excludes weekends and public holidays, be replaced by a full 5 in 7 day shift system of work at straight time rates of pay. The union is of the view that weekend and public holiday overtime work, which it estimates represents 65% of gross earnings, must be bought out by the management based on a cost sharing formula. The union has proposed that 40% of the cost savings be applied to an increase in basic wages and salaries and 25% saved by the management.

- **New Jobs Classification:** The union has identified newly created job categories at the container terminal, which have not been placed on a new organizational chart and approved establishment. These new jobs are planners, quay officers and yard clerks.

- **Marine Agreement in TTIT:** The collective agreement for the TTIT unit, which operates the inter-island ferry service, is still based on the existing PATT agreement in which terms and conditions are established in parity with other shore based positions. Consequently, it is difficult to retain marine staff under conditions in which wages and salaries are uncompetitive with marine industry benchmarks. The union has proposed that a separate marine collective agreement be negotiated.

- **Marine Management of TTIT:** The union has advised that the foreign officers employed by Bay Ferries, the Canadian Ferry management and maintenance contract manager, earn 67% more in salaries compared to the local officers, which is a strong dis-incentive to performance. The union has cited cases in which local officers have had to wait as long as 4 years to be type rated in order to take up positions on the ferries. Consequently, there is no incentive for Bay ferries to train and develop the local officers to assume positions on the ferries. In addition, it has been reported that the charter management operator of the Warrior Spirit cargo vessel has been recruiting foreign ratings to perform lower level functions of deckhands, oilers and motorman. The union has proposed that a
proper transition plan be implemented in order to return the management and maintenance of the ferries to PATT.

- Towage services: Since 2005, both of the PATT tugs, the Snapper and the Bonito, have been out of service and due for replacement. In the interim, the National Energy Company (NEC) provides towages services for vessels calling at Port of Spain. The Union has proposed a joint venture foreign partnership to provide towage services.

Point Lisas Industrial Port Development Corporation

Organization and Management at Port of Point Lisas

The National Gas Company (NGC), through its subsidiary, the National Energy Corporation (NEC) is responsible for the development of marine and port infrastructure at Point Lisas, which includes the development of the upstream and downstream energy and industrial estates located at Point Lisas, La Brea and Point Galeota. The NEC is responsible for the provision of the marine and port infrastructure, construction of berths, the dredging and maintenance of the Savonetta channel and basin, navigation aids and the towage services at commercial rates.

The port estate covers leasehold agreements in the energy and petro-chemical downstream industries. Lease-holdings occupy 100% of available acreage therefore revenues are consistent and predictable and account for the most significant share of recurrent revenues.

Figure 10-30 shows that the industrial port infrastructure is comprised of specialized ports and terminals designed to accommodate the specific user requirements for the handling of industrial liquid, gas, and dry bulk cargoes for the energy sector upstream and downstream industries.

Figure 10-30. Main Leasehold Operators at the Port of Point Lisas

<table>
<thead>
<tr>
<th>Customer</th>
<th>Product</th>
<th>Pier</th>
</tr>
</thead>
<tbody>
<tr>
<td>Methanol Holdings Trinidad Limited – 5 Plants</td>
<td>Methanol</td>
<td>SP1S,SP2S,SP2N</td>
</tr>
<tr>
<td>Atlas Methanol Company Unlimited</td>
<td>Methanol</td>
<td>SP3</td>
</tr>
<tr>
<td>Methanex Trinidad Limited</td>
<td>Methanol</td>
<td>SP4</td>
</tr>
<tr>
<td>PCS Nitrogen (Trinidad) Limited – 1 Plant</td>
<td>Urea</td>
<td>SP1S</td>
</tr>
<tr>
<td>Mittal Steel Point Lisas Limited</td>
<td>Metals</td>
<td>Arcelor Mittal Dock</td>
</tr>
<tr>
<td>Mittal Steel (USA) Trinidad - formerly ISG (Trinidad)</td>
<td>Metals</td>
<td>SP4</td>
</tr>
<tr>
<td>Nu-Iron Unlimited</td>
<td>Metals</td>
<td>SP3</td>
</tr>
<tr>
<td>Ventrin Petroleum Limited</td>
<td>Bunker Fuels</td>
<td>SP1S,SP2S,SP2N</td>
</tr>
<tr>
<td>Point Lisas Nitrogen Limited</td>
<td>Ammonia</td>
<td>SP2S</td>
</tr>
<tr>
<td>Caribbean Nitrogen Company Limited</td>
<td>Ammonia</td>
<td>SP4</td>
</tr>
<tr>
<td>Nitrogen 2000 Unlimited</td>
<td>Ammonia</td>
<td>SP4</td>
</tr>
<tr>
<td>PCS Nitrogen (Trinidad) Limited – 4 Plants</td>
<td>Ammonia</td>
<td>SP1S,SP2S,SP2N</td>
</tr>
<tr>
<td>Shell Trinidad Limited</td>
<td>Base Oils</td>
<td>SP1S</td>
</tr>
<tr>
<td>Importers of Grains</td>
<td>Grains</td>
<td>SP4</td>
</tr>
<tr>
<td>Importers of Aggregate</td>
<td>Aggregate</td>
<td>SP4</td>
</tr>
<tr>
<td>MHTL AUM Plant</td>
<td>UAN Solution 32</td>
<td>SP3</td>
</tr>
</tbody>
</table>

Source: National Energy Corporation
PLIPDECO is the corporate body established to manage the Point Lisas Industrial Estate. The corporation is 51% majority owned by government and related state enterprises and 49% owned by private sector shareholders. Consequently, PLIPDECO reports to the client line Ministry of Trade and Industry. The general cargo handling operations (conventional break-bulk and containerized) is managed by a subsidiary company Point Lisas Terminals Limited.

**Outstanding collective agreements**

The status of outstanding collective agreements is as follows: Outstanding Collective Agreement (2012-2015):- The collective agreement for (2009-2012) expired in June 2012 for weekly paid workers and in November 2012 for monthly paid workers. PLIPDECO is awaiting clearance from the office of the CPO before negotiations can commence in March 2013.

**Contract issues affecting port productivity and performance at PLIPDECO**

- **Training and development:** Training programmes have been identified for the management development of staff and skilled technicians. However, training programmes are required for the container handling equipment operators. The training programmes should take account of the certification requirements of the Licensing Authority, which requires heavy equipment operators to obtain a class 5 permit before a class 7 permit may be issued for other classes of vehicles, which covers specialized port equipment.

- **Wages and Salaries:** Better wages and salaries should be considered in order to retain the skilled port workers at PLIPDECO. Quite recently, an offshore transshipment operator at Point Lisas attempted to poach trained stevedores, seamen, linesmen, and crane operators from PLIPDECO and it was only because of the intervention at the management and ministerial level that a potential crisis in port operations was averted.

- **Crane Maintenance Area:** Major refurbishment works were completed of the ship to shore and rubber tyred gantry cranes in 2012. However, the Health and Safety conditions of the maintenance work area need to be improved for the effective performance of the equipment maintenance function. The equipment maintenance function is important having regard to the heavy industrial pollution, which results from the operation of the steel, ammonia and methanol plants upwind of the general cargo port facilities. It is estimated that the lifespan of cargo handling equipment at Port Point Lisas is 50% less than similar equipment at the PATT and the established global benchmarks. In addition, the mean maintenance cost of plant, equipment and facilities at Port Point Lisas is 175% higher than at PATT and 120% more than the established global benchmarks (Seetahal 2011).

**Conclusion for Labor Issues and Challenges**

In order for there to be an improvement in the industrial relations climate at both ports, there needs to be a greater focus on the collective bargaining process and the execution of collective agreements in a timely manner. The collective bargaining process must be focused beyond the conclusion of negotiation for wages and salaries and compensation benefits to include health
and safety issues and best practices and industry benchmarks in order to improve the level of occupational health and safety, performance and productivity at both ports.

In the case of PATT, it is reported that the management has not met with the union over the last 5 years. If this is true, then urgent corrective action is urgently required to improve the industrial relations situation. It is important that a non-crisis forum be instituted in order to adopt a non-confrontational approach to industrial relations and the collective bargaining process.

With respect to training and development, it is not clear why the joint management/union training committee and the sub-registration were disbanded at PATT. However, this mechanism should be re-instituted in order to provide a structured and sustained management approach to training and development particularly as it relates to the container terminal operations and equipment maintenance at both ports.

It is also important that the age profile of workers in the ports industry be reviewed and a structured training and development plan be implemented at both ports. The last time a structured training and development plan was implemented was in 1987 when the ILO/UNDP/GORTT Training and Development Project was implemented in all aspects of general cargo operations including, break bulk, warehousing, container terminal management and equipment maintenance.
## Addendum: Response to Comments

<table>
<thead>
<tr>
<th>Comment / Question</th>
<th>Response</th>
</tr>
</thead>
<tbody>
<tr>
<td>Will the existence of the energy port in Galeota Point have any impact on rationalization decisions related to other ports?</td>
<td>Following the scope of work, we did not conduct an in-depth study of Galeota port with regards to the containers-related Rationalization Plan. However, based on our investigation of the other ports, it preliminary seems to us that the direct impact of this port on the Plan would be limited. From NEC information, Galeota Phase I development provides a turning basin depth of 7.6 m; our assessment concludes that a new T&amp;T container port facility should be able to serve Post-Panamax ships that require 16m depth. Therefore, Galeota does not seem a good candidate without provisions for more than doubling the turning basin / channel depth. Most importantly, trucking costs will be significant higher if shipping lines have to call at Galeota. The distance from Galeota Point to Port of Spain is 115km and to Point Lisas is 95 km, so for cargo clustered around these locations the extra trucking cost could reach of US$200.</td>
</tr>
<tr>
<td>The question of demand side of the Panama Canal and any strategic niche has been answered.</td>
<td>No comment.</td>
</tr>
<tr>
<td>I think the Report should make more forcibly the point that if TT does not upgrade current facilities and capacities of one of the container ports, the danger of reduction in transhipment operations is very likely because the size of the vessels currently used will increase, even if there is no increase in trade.</td>
<td>As extensively addressed in our report, there is a clear trend of increase in ship size in both Through and Specialist Caribbean shipping services (see Sections 3.2 and 5.1). This worldwide trend is not directly related to the pending Panama Canal expansion but it is likely to accelerate once the Canal is expanded. T&amp;T facilities cannot efficiently serve post-Panamax ships; the services presently provided to full-Panamax ships are inadequate (see Section on Port of Spain). Failing to be able to efficiently handle post-Panamax ships may hurt T&amp;T competitive position vis-à-vis its competing hub ports, especially Caucedo, Kingston and Cartagena. These ports’ present facilities and efficiency is superior to those in T&amp;T.</td>
</tr>
</tbody>
</table>
Also, I need a clear recommendation for which of the 3 options is the preferred one and why. The rationale for this recommendation should view the options from the sea side - so that the logistical requirements of getting big ships to dock will be fully taken into account.

Our report defines three development plans for T&T container terminals. The report also indicates that each of the planned terminal could accommodate ALL future traffic, both domestic and transshipment, included in the High-Growth Case forecast. The report also briefly reviews these planned terminals but does not make recommendation on which one to select.

We are pleased that T&T Government agrees with our recommendation that T&T needs only one modern, deep-water container terminal. However, based on the data available to us we cannot recommend at this point which of the three candidate ports to select. It is an important decision that mandates additional in-depth study devoted to site selection. This study, indeed, should incorporate the factors listed by you including:

- Labor and management issues
- Synergy with non-containerized cargoes
- Pilotage cost
- Road access
- Alternative use of waterfront sites, especially in the case of PPOS

There are other factors that we suggest to consider for the site selection, including:

- Conceptual terminal design, including berthing (docks), yard and gate facilities, equipment (if not the same for all terminals), conceptual engineering and cost estimates
- Hinterland cost (for domestic cargo)
- Support facilities (dry ports, FTZ, industrial estates)
- Environmental considerations and mitigation costs
- Private sector participation
- New channel design and respective capital and maintenance costs (life cycle)
- Conceptual design breakwaters (if needed) and respective cost of clearing channels, turning basin and anchorage areas from sunken objects

Strictly from the sea side point of view, just the technical assessment of which site is preferable is simply not possible without an analysis of the last two factors listed (underlined).
Addendum:
Response to Comments

<table>
<thead>
<tr>
<th>Comment / Question</th>
<th>Response</th>
</tr>
</thead>
<tbody>
<tr>
<td>Please have them consider the following issues and to give me clear, unequivocal answers.</td>
<td></td>
</tr>
<tr>
<td>• PLIPDECO is already more efficient and has better equipment and system than PPOS.</td>
<td>Yes, but PLIPDECO only handles small ships.</td>
</tr>
<tr>
<td>• The same union operates in PLIPDECO as in PPOS, but there are much fewer labor issues.</td>
<td>Yes.</td>
</tr>
<tr>
<td>• The expansion can be combined with other types of shipping already onsite to spread the cost over various sectors of the industry rather than relying on containerization only. Clustering the shipping sectors will give economies of scale.</td>
<td>Agree.</td>
</tr>
<tr>
<td>• Won’t there in fact be significantly less dredging required for a 17m access channel. The 20m contour is approximately 4-5 times closer to the port than it is at PPOS. To get to 17m the PPOS channel will have to be extended to twice its current length. The PLIPDECO channel may only need to be slightly longer than it is currently. To put it in perspective, currently Sea Lots is restricted to a MAX of 5m on high tide. To get access there at 17m chart datum would be a monumental task requiring a channel more than 7 miles long. Let them speak to these issues factually and coherently.</td>
<td>We have not reviewed the bathymetry and soil condition at the three port sites. Such review should be part of the proposed study on site selection.</td>
</tr>
<tr>
<td>• La Brea is surrounded by numerous abandoned well heads. There are strong currents, and it regularly gets quite rough. Is La Brea then a good option and why?</td>
<td>Water access is the first assessment that a port project should perform. Navigation conditions (winds, waves, currents, channel design, turning basin) have to be studied for different ship types and sizes to evaluate current conditions and the effect of water works (breakwaters). We simply cannot provide an answer to this question.</td>
</tr>
<tr>
<td>Comment / Question</td>
<td>Response</td>
</tr>
<tr>
<td>--------------------</td>
<td>----------</td>
</tr>
<tr>
<td>Shore access to an expanded capacity port will cause more difficulty in POS. PLIPDECO can much more easily be linked to the highway.</td>
<td>This is correct. But, currently, PLIPDECO has a very restricted road linking it to the highway. A future port development at PLIPDECO has to be accompanied by a new road, preferable only for heavy traffic, linking the terminal to the highway. Also, the development of a Container Freight Station (CFS) or dry port (warehouse where containers are stuffed and de-stuffed) outside of the port area will substantially reduce traffic to/from the port. Currently CFS activities are performed inside the marine terminal and smaller trucks create additional traffic on the road in proximity to the port. Transshipment traffic, responsible for most future growth, does not impact road traffic.</td>
</tr>
<tr>
<td>By relocating from PPOS, the city waterfront can be redeveloped in the long term.</td>
<td>In the long term, yes. But in the short and midterm, PPOS could continue working as a backup terminal, for some small breakbulk cargoes, or small shipping lines, or cruises.</td>
</tr>
<tr>
<td>In the short to medium term, the energy support services in Chaguaramas can be relocated to PPOS to allow Chaguaramas to be used to grow the Yachting sector and/or the Ship repair sector. This will only be short term however, as the new port in Galeota is carded to be the main base for the energy support sector.</td>
<td>We need more information on this subject. But, in general, PPOS, should remain active in the short, midterm until other ports fully develop and consolidate their markets. These issues as well as others (see above) should be examined in an in-depth port selection study.</td>
</tr>
<tr>
<td>La Brea is a more difficult area for shipping and would require significantly more infrastructure to accommodate the same size vessels. They need to explain whether the Mitsubishi investment and other proposed investments will offset such considerations and justify the expenditure required for this location.</td>
<td>Documents on Mitsubishi investment have not been available to us.</td>
</tr>
<tr>
<td>If for instance, the preference, based on the evidence is for Point Lisas, then would there be justification for development for both Point Lisas and La Brea, even after Galeota?</td>
<td>A pivotal finding of our study is that there is need for ONE modern, deep-water container terminal to handle the traffic defined in the High-Growth Scenario.</td>
</tr>
</tbody>
</table>
We have reviewed background information provided by the IADB in its “TECHNICAL COOPERATION DOCUMENT, GUYANA – BRAZIL LAND TRANSPORT LINK AND DEEP WATER PORT (GY-T1098)”, November 2013. Interestingly, the document references a previous Deep-Water Port study conducted by Dr. Ashar and Eng. Paul Woodbury; both experts are closely affiliated with Nathan Associates Inc.

It is difficult to provide even a rough assessment of the container traffic volume generated at the two Brazilian states that will use Guyana ports if the road is built. However, we believe that the volume will be limited. Likewise, the future container demand of Guyana and potentially from the mentioned Brazilian states would be still too small to justify a direct call by a global line (see Section 3.3 Main Shipping Lines and Services). Hence, it is reasonable to assume that T&T ports will retain their present role as regional hub for Guyana and Northern Brazil.