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PRINCIPLES OF PORT TARIFF ANALYSIS

CAP-HAITIEN PORT REGULATORY STRENGTHENING PROJECT

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PRINCIPLES OF PORT TARIFF ANALYSIS

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ACRONYMS

ABS	American Bureau of Shipping
APN	Autorité Portuaire Nationale
CAPM	Capital Asset Pricing Model
CAPEX	Capital Expenses
GRT	Gross Registered Tons
OPEX	Operating Expenses
ROI	Rate of Return
RTG	Rubber Tired Gantry
TEU	Twenty foot equivalent units

INTRODUCTION

Haiti aims to transform its port sector to reflect modernized institutional arrangements in order to boost trade and grow the national economy. This mirrors changes, commencing decades ago, where governments sought to change the nature of the port authority's role in an effort to improve port performance. Introducing the private sector to provide port services in the arena of competition was viewed by most as the ideal solution for improving port efficiency and productivity, with the port authority playing a "landlord" role in port administration. Generally, this means that the port authority regulates commerce in the port by setting operational rules and regulations, monitoring terminal operator performance, providing common use facilities, and planning for port expansion as available capacity nears its maximum limits. Initially viewed as an experiment, the landlord form of port administration has become global best practice; in fact, greater than 95 percent of the world's largest container ports and 80 percent of Latin American-Caribbean region ports are administered as landlord ports.

The port of Cap Haitien, with USAID support, will have a modern container terminal to be operated by a private terminal operator in the near future. Because cargo volumes are relatively low, introducing competition to discipline port prices is not a practical option. Instead, Haiti has chosen a course where prices for a range of services will be regulated by contract. Haiti has defined a number of services, usually referred to as standard or basic services, and combined them as a "basket" of services whose prices will be subjected to the maximum limits imposed by the contract with the terminal operator. But as we show in this report, this is not without risk as terminal operators seek to expand revenues beyond what they expect to generate from regulated charges for the basket of services.

The terminal operator contract will provide for fixed and variable payments to APN, the fixed payment covering the operator's rent for the terminal and the variable payment constituting a royalty payment for each unit (container) or ton (non-containerized cargoes) handled by the terminal operator. In addition to these revenues, APN generates others from a wharfage charge on domestic containers handled in its ports and for services that APN provides, among them tug assist and pilotage.

APN is well aware of the potential pressures its ports face from competition, but also needs to cover its budget. The right prices can lead a port to prosperity and growth and cover budgetary commitments; the wrong ones can reduce demand for services and have deleterious effects on APN's financial performance. So APN has an important role to fill in its regulatory role: APN must ensure fair pricing for terminal operator services and prevent circumventing the basket of services tariff limits; and APN must also ensure that its own prices render Haitian ports non-competitive.

Chapter 2 first introduces the reader to the port logistics chain, describing the main services that occur in a container terminal operation. We then explain how post-port sector reform has increased the complexity of transaction flows, with an exponential increase in the number of market players and charges that affect the total cost to port users. We then discuss regulatory concerns and introduce the reader to the fictitious Port Champignon and its two rival terminal operators, Grillé Terminal Company and Sauté Terminal Company, to describe abusive pricing practices and how they can be mitigated. While the port and the two terminal operators are fictitious, the risks described reflect reality.

Chapter 3 briefly describes the concepts of tariff adjustments. Generally, adjustments can be made in accord with inflationary effects or in accord with operator profitability. For reasons explained, profitability-based adjustment is a difficult concept to accommodate in the port sector, with the Cap Haitien contract opting for the inflation index-based adjustment. The Chapter concludes by emphasizing the role of port users in tariff monitoring and the need for the regulator to establish a complaint procedure.

Chapter 4 presents APN's tariff structure. Using Port Lafito as an example, we illustrate the charge flows environment, which is generally reflective of the global post-port reform environment that Chapter 2 describes. Unfortunately, some of the lessons learned from the experience described in Chapter 2 are not reflected in the tariff provisions of the Cap Haitien contract, though the contract provisions addressing terminal operator tariffs are in accord with acceptable practice.

In an effort to enable APN to make decisions about tariff levels and understand them in the context of price competitiveness and APN financial performance, we present in Chapter 5 the features of a tariff analysis model as a decision-support tool for APN. A stand-alone instruction guide to accompany the Tariff Analysis Tool has already been prepared.

I. PORT SERVICES AND CHARGES

A port essentially consists of a production process involving a variety of activities performed by government authorities and terminal operators. The production process involves a series of links (when a container is moving) and nodes (where a container is being processed) upon which the government authorities and terminal operator will impose a charge. Generally, charges can be categorized as port dues, which normally cover navigation fees that are intended to cover the cost of providing and maintaining navigation aids, breakwaters, the navigation channel, terminal related charges (for activities occurring between the berth and the port gate), and other charges for services provided outside the terminal (e.g. pilotage and tug assist). Charges may also be applied by government authorities for common access areas, that is, areas commonly used by all or most port service providers, such as traffic routes, parking areas, perimeter gates, and anchorage. Common access area charges, normally charged as infrastructure or wharfage fees, are usually applied by port authorities. Port authorities may also provide tug assist and pilotage, in which case they also impose a charge. Excluding tug assist and pilotage, port authorities may apply the aggregate of port authority charges as port dues, while terminal operators apply charges for services provided between berth and gate through a tariff.

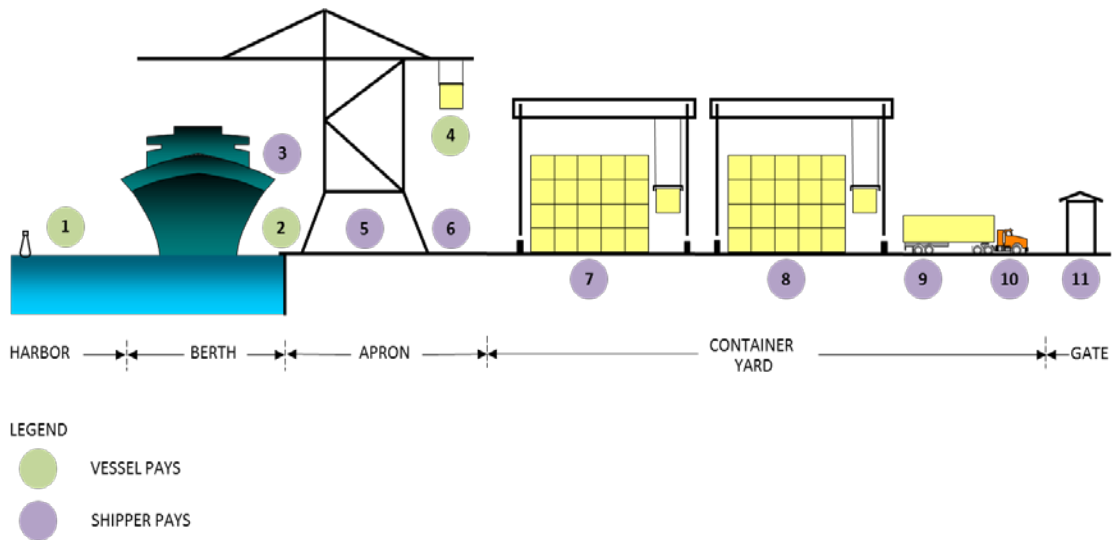
Figure I is a graphic representation of the port logistics chain that identifies a range of basic services and who is charged for these services – generally, the shipper (the importer and exporter) and carrier (or ship's agent). The graphic shows the sequence of 11 general activities in the port and is described as follows:

1. A navigation pilot boards the vessel and guides the vessel's captain through the port's entrance channel. If no berth is available, the ship is assigned to an anchorage area, the use for which the vessel operator may be charged, usually by another government entity, such as the port captain or maritime authority. As the ship reaches the berth, one or two tugs, depending on ship size and port regulatory requirements, will greet the ship to help it maneuver to the berth. Line handlers then tie two lines to the berth. At this point, the ship has incurred charges for navigation or port dues (to

cover the cost of dredging the channel and providing lights and buoys for navigation safety), pilotage, tug assist, and line handling.

2. Once the ship is secured to the berth, the port authority or terminal operator may apply a berthage charge (i.e., essentially, a “parking” fee applied to the time the vessel takes the berth space relative to vessel length), usually calculated on the basis of time and vessel size (length). The berthage charge stops when the last line is untied from the ship as it leaves the berth. The charge is applied to the vessel. In some cases, line handling may be incorporated into the berthage charge.

Figure 1. The Port Logistics Chain¹



3. Inspection authorities (e.g. defense security, drug enforcement, immigration) may board the ship. Usually cargo is not loaded or unloaded until the authorities have completed their inspections.
4. The first shift of longshoremen or stevedores (referred to as a gang) loads or unloads cargo using a crane. Containers are “lashed” (secured to the crane) by gang members. Some ships have their own cranes, though vessel cranes (usually referred to as ship’s gear) are not as productive as gantry cranes; hence, many operators will impose the use of their gantry cranes on such vessels, though even in this case gantry crane productivity will still be lower than what it would be for vessels not having cranes as ship’s gear constrain gantry crane productivity. Productivity rates for gantry cranes are in the range of about 25-30 moves per hour. “Moves” are the movements of a container between the ship and the apron, the area at the berth set aside for loading and unloading. The charge for crane use, which is applied to the ship, can be on a per

¹ Based on Kent, Paul E. and Alan Fox, “Is Puerto Limon a Real Lemon? The Impact of Port Inefficiency on a National Economy”, in *The International Handbook of Maritime Economics*, edited by Kevin Cullinane, 2011.

move basis and may differentiate between container type (20-footer, 40-footer), whether the container is loaded or empty, or if it is a transshipment container.

5. The charge for the “move” is intended to cover the use of the apron and other areas of the terminal where the container is moved to or from storage. This constitutes a wharfage charge. Wharfage is charged to the shipper (i.e., importer or exporter).
6. The container seal is inspected and a fee may apply. If so, it is also charged to the shipper.
7. This area as a whole constitutes “dispatch,” where the container is moved to or from an assigned slot (a space in the yard). Container storage operations occur in the yard. Dispatch fees are charged to the shipper. Some ports, particularly smaller ones, may not have a true storage area, but instead have a small area that serves as a buffer between the berth operation and the area behind the berth. In such cases, trucks quickly evacuate containers from the buffer storage area or the container may be loaded onto a truck directly from the vessel for immediate evacuation to an off-dock storage area, sometimes referred to as a satellite storage area. Cap Haitien and the Aleman container terminal in Puerto Limón, Costa Rica have very limited or no buffer storage capacity and hence require prompt evacuation of containers.
8. The container is stored until it is inspected and claimed by the shipper (importer). Ports having storage areas offer free storage, usually about 2-3 days, and the free storage period for exports is usually longer than for imports as some countries are promoting exports. After the free storage period expires, storage charges apply. In an effort to manage the storage operation, the terminal operator will lower prices when demand is low (and hence the storage area will have excess capacity) to encourage the use of available storage, while increasing storage charges when capacity is constrained to encourage shippers to have their containers quickly evacuated. Quick evacuation also helps mitigate terminal congestion when demand is high. Shippers may have other storage options if the terminal’s storage prices are too high, thus evacuating their containers and moving the containers to off-dock storage areas. Charges vary according to the direction of the container (import or export), whether it is full or empty, or by size. The storage fee is charged to the shipper.
9. The container is cleared or inspected by customs and moved onto a truck chassis. The operator will charge for moving the container to the Customs inspection area, which is also charged to the shipper.
10. Some ports may employ container scanners for which there may also be a charge applied to the shipper.
11. Gate processing includes weighing the container (for which there is a scale charge) and reviewing paperwork. These charges apply to the shipper.

In facilitating the many processes taking place in the container terminal, terminal operators employ terminal operating systems (computerized process control systems) that ensure equipment readiness to carry a container and real time tracking of each container’s position in the terminal and stage of Customs processing. In this way, containers and equipment are optimally staged, reducing idle time of both equipment

and containers. Terminal operating systems today are designed to accommodate changes in documentation requirements imposed by countries and brought about by trade agreements. Additionally, data collected through the terminal operating system can be used to generate reports for the port authority or regulatory body charged with monitoring terminal operator performance and adherence to tariff and performance standards in concession agreements.

PORT REFORM IMPACT ON PORT LOGISTICS CHAIN CHARGE FLOWS

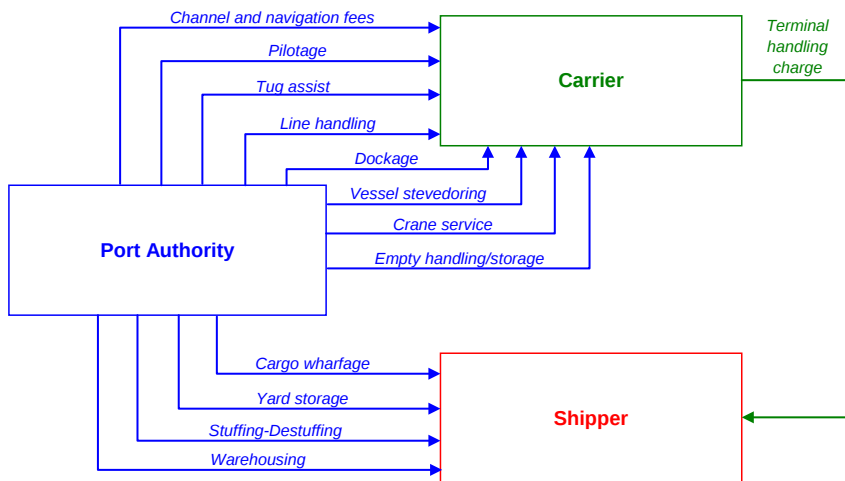
As earlier noted, port privatization has changed the nature of the accounting relationships of the various parties providing port services. In pre-privatization, the port authority, which traditionally served as both operator and regulator (generally over the carrier's operational practices), provided the full range of services required for serving the vessel and the cargo. Hence, port service charges were made by the port authority to either the carriers or shippers. Generally, no other party was involved.²

Figures 2 and 3 demonstrate the dramatic changes that privatization has brought relative to who provides the service and hence, who charges for the service. As Figure 2 shows, in the *pre-privatization* arena charges flowed from the port authority either to carriers or to shippers. Carriers in turn billed shippers for terminal handling charges the port authority charged to the carrier in the vessel handling operation (loading and discharging cargo); these charges were reflected on the carrier's freight invoice to the shipper.

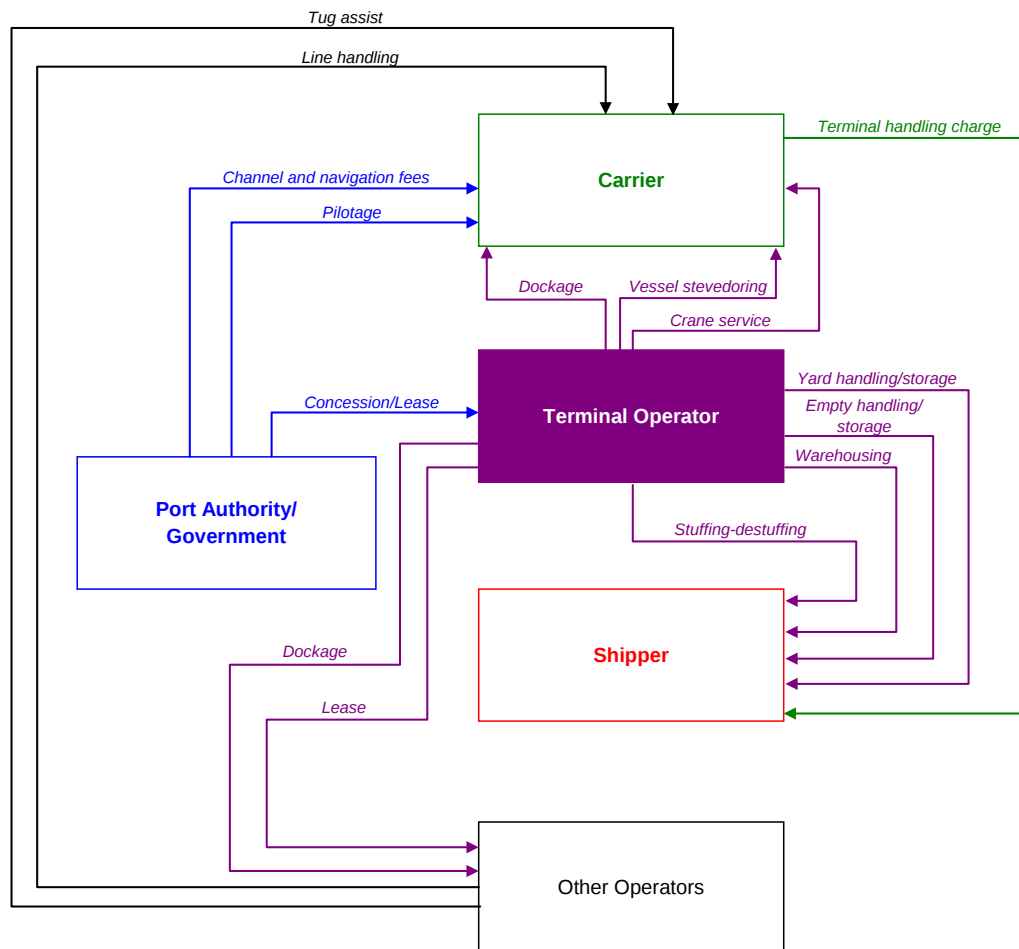
Figure 3 provides the flow of charges in post-privatization environments, depicting a major shift of charge flows from the port authority to the terminal operator. As suggested earlier, the flow of charges is rendered more complex given the changed roles of both government and port service providers after privatization. The government no longer "touches" the cargo (as an "operating" port), but instead retains a port administration role while land and facilities are leased or concessioned to private sector parties (a "landlord" port). In the vast majority of privatization programs, the focus has been on concessioning existing terminal facilities (with requirements for improvements and/or expansion), but some countries have also granted licenses or even concessions for pilotage and tug assist (e.g. Colombia).³

²Of course, there are always exceptions. In some port authorities (e.g. Karachi Port Trust, Bombay Port Trust), workers were hired from labor pools organized to provide workers for vessel handling.

³Pilotage (considered a public safety function) remains a government responsibility in most countries that have undertaken port privatization. One exception is in the United States, where the majority of pilots are members of (private) pilotage associations authorized to provide service in a specific port. Each pilotage association is given monopoly jurisdiction over a specific coastal area or segment on a river. In Louisiana, for example, vessels sailing from the Gulf of Mexico to Baton Rouge must retain three different pilots. Pilotage associations in Louisiana are regulated as a public utility, with the requirement that rate increases must be sought from and approved by a public service commission. For more information on U.S. pilotage systems, and the Louisiana case in particular, see Kent, Paul E. and John H. Binkley, "State Oversight of Pilotage in the United States: Louisiana as a Case Study," *Transportation Quarterly*, Vol. 44, No. 1, January 1990.

Figure 2. Flow of Port Charges Before Privatization

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Figure 3. Flow of Charges After Privatization

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Thus, in the *post-privatization* arena, the port authority is responsible for providing pilotage services and a safe navigation channel. The government or port authority collects concession payments from the terminal operator (the concessionaire), usually in the form of a fixed payment (e.g. annual rental) and/or a variable payment (e.g. a royalty on each unit of cargo handled). The terminal operator assumes responsibility for the berth-to-gate cargo handling operation, while other port service providers receive licenses or concessions to provide line handling and tug assist (unless these responsibilities are assumed by the port authority or operator). Hence, the port authority's charge flows (minus the concession/lease payment) have been reduced from charges for at least 12 services to no more than two services. The terminal operator in turn may represent charge flows for at least nine main services, including leasing space on the terminal for the equipment of other operators as well as charging dockage fees to the tug assist companies, who in turn need space to berth their vessels.

It is important to note that the terminal operator may in turn subcontract some of its business functions (e.g. warehousing, container lashing, vessel stevedoring, yard operations, etc.) to other companies. While the services shown here are only the main services available in a port, a privatized port involves a multi-layered system that could reach several hundred services and charges.⁴ Thus, it is no longer just the port authority, carriers, and shippers involved in charge flows. Now, it is the port authority, carriers, shippers, and a host of third party service providers and the markets they serve.

PRICING AND REGULATORY CONCERNS

The port privatization waves of the 1980s, 1990s, and post 2000 have generally seen the avoidance of monopolies as the services managed by port authorities were transferred to the private sector. For the most part, governments have been able to create inter-terminal competition or understood that inter-port competition would prevail. However, given the scale and scope of port operations, we can at best expect that terminal operators exist in an oligopolistic environment. This means even where there are two or more operators competing for the same market that the risk of monopoly-like behavior exists. Hence, the risk of anti-competitive behavior that arises in markets characterized as having dominant players exists in the port sector as well; predatory pricing and market and pricing collusion may arise in a port environment.⁵

In addition to the threat of anti-competitive behavior among a limited number of rival operators, to some degree terminal operators can exercise monopolistic tendencies among its own customers because of their dominance over a range of services. Let's set a scenario to demonstrate how this

⁴ Ashar, Asaf, "Strategic Pricing in Newly Privatized Ports", *International Journal of Maritime Economics (IJME)*, Volume III, No I, March 2001, p. 55.

⁵ For a thorough examination of the risk of monopoly behavior, how to induce competition to avoid it, and how to monitor for such behavior, see Kent, Paul E., "Monitoring for Port Antitrust Behavior: An Operational Model and Future Challenges", *Annual Conference Proceedings: International Association of Maritime Economists*, November 2002, Panama.

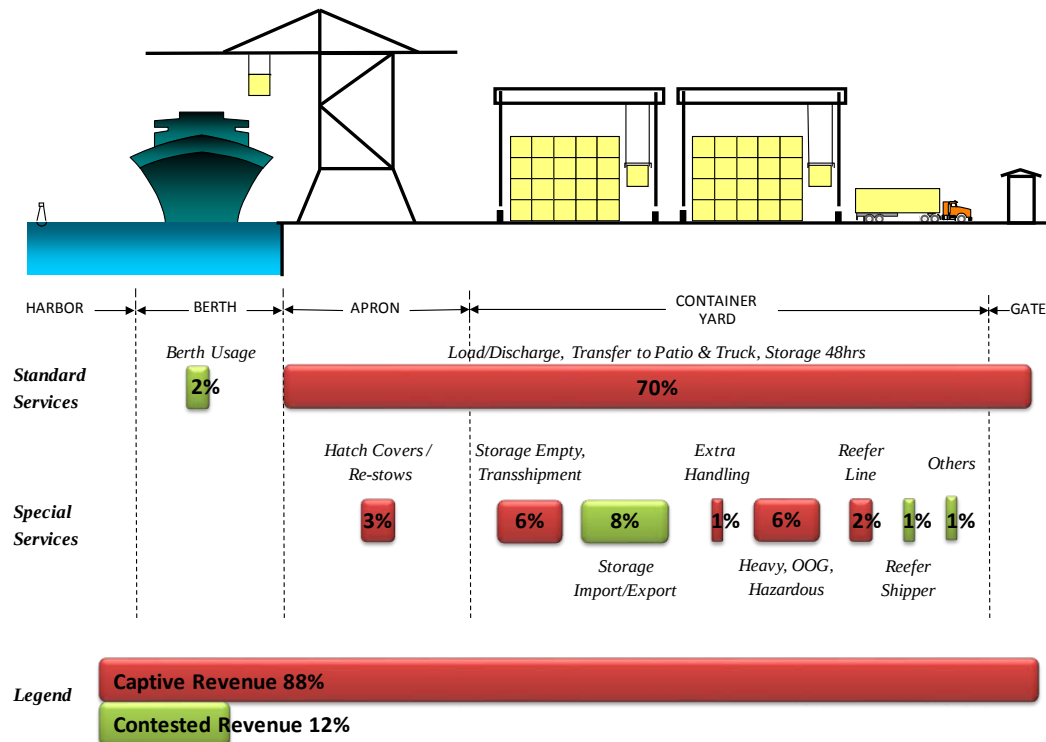
happens. Let's say that a port in France, which we will call Port Champignon, has two rival terminal operators, Grillé Terminal Company and Sauté Terminal Company. They both vie for the same market in the container trades. In competing for business, terminal operators typically place priority in attracting a carrier to the terminal – once the carrier makes a commitment to call a terminal, then the terminal operator knows it will get the container handling business. So these fierce rivals lower their berth fees, even matching each other's prices. But Grillé's terminal only has two gantry cranes, while Sauté's terminal has three that it can deploy to serve the vessel. To compensate the carrier for its inferior crane productivity, Grillé lowers its rates to \$0 for both berth fees and container handling charges. Sauté responds by offering free berthage to the carrier, as Grillé has done. The carrier is seduced by Sauté's higher productivity and signs a one-year service agreement with Sauté. As long as the carrier calls only Sauté's terminal, then no charges will be applied to the carrier.

The Port Champignon scenario begs the question as to why the operator is willing to forgo revenues from the carrier. It is because Sauté exercises dominance, essentially a monopoly, over a range of other services that the terminal provides. Let's revisit Figure 1's port logistics chain to show how this happens. Figure 4 shows the port logistics chain again, but we've added the types of main services offered at each point of the terminal operation, dividing them between two categories, standard and special services. Standard services comprise those that are applied to all carriers and the containers that are loaded or discharged and moved through or stored in the terminal. Special services are those requested of the carrier (e.g. hatch cover removal or re-stowing a container on the vessel) or the shipper (e.g. storage) that are not typically provided to every vessel or every container.

So when a carrier calls, and a container is discharged from the vessel, it is not possible as a practical matter for the shipper (the importer) to have its preferred service provider send equipment into Sauté's terminal and move the container from the berth to Grillé's terminal for processing and/or storage. First, such a move would hamper Sauté's berth and terminal productivity and second, a truck would charge a drayage fee to move the container from one terminal to the other and each of the two terminal operators will charge a gate fee as the container exits one terminal and enters another. Customers are thus held captive by virtue of the carrier's decision to call a terminal.

Figure 4 shows what may be considered a representative depiction of the proportional revenue allocations terminal operators generate from the range of standard and special services provided in the container terminal. As Figure 4 shows, 88 percent of terminal revenues are generated through captive services from charges that the terminal operator applies. To offset the revenues lost from berthage fees, Sauté can increase the charges on captive services.

Figure 4. Captive Services in the Port Production Process



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Let's assume that the regulator anticipates the possibility of abuse of captive services, so it imposes maximum tariff restrictions on Sauté and Grillé for these services. Normally, a good regulator will precisely define what the service is so that it is clear Sauté, Grillé, and the regulator are on the same page. To get around such restrictions, Sauté or Grillé may be tempted to charge fees for a range of services not addressed by the regulator, some of which in fact may be unusual given prevailing tariff practices. Such an example lies in hatch cover moves.

Likened to a lid on a box to protect its contents, hatch covers are used to cover and protect containers that are stored in the hulls below a ship's deck (Figure 5). Before a ship arrives to a terminal, it is required to have submitted its stowage plan in advance of its arrival, usually 24 hours before. Containers may be stored below the ship's deck or on the ship's deck. The stowage plan reflects the position of all the containers the ship is carrying relevant to the specific port of call. Receiving the stowage plan in advance enables the terminal operator to prepare an operations plan, that is, a plan for container loading and discharge, before the vessel arrives.

Figure 5. Ship-to-Shore Hatch Cover Move

Photo Source: SMS Marine Systems. Note hatch covers can be lifted and placed on the ship or on the berth, depending on operational requirements. The charge for hatch lift to berth is usually higher than moving elsewhere on the vessel.

So let's assume a vessel's stowage plan shows that containers are to be unloaded from below the ship's deck. In this instance, the terminal operator cannot generate revenues without lifting the hatch. So the operator, as long as it is keeping with the carrier's submitted stowage plan, should not be permitted to charge the carrier for hatch lifts. However, in circumstances where the carrier requests a container below the deck to be discharged that was not part of the filed stowage plan, then the terminal operator will charge a hatch lift fee.

The regulator typically will not understand the nuances between the "normal" hatch cover moves and the exception described above. So Sauté or Grillé will seek authorization from the regulator to charge a hatch fee, arguing that hatch moves are not covered by charges assessed for loading/discharge, although the norm suggests otherwise. A question arises, however, as to why Sauté would on the one hand provide free berthage and on the other charge the carrier a hatch fee.

Let's take a look at the relevant components of a real tariff for the Puerto Caucedo container terminal in the Dominican Republic.⁶ The berth charge there (referred to as dockage in the tariff) is based on the vessel's length at a rate of \$1.39/foot of the vessel's length per day.⁷ So a Panamax container ship, say of 4500 TEU capacity, can have a length of up to about 290 meters, or about 951 feet. So the berthage charge would be about \$1,322/day. The same tariff indicates a hatch move charge of \$120/lift (each

⁶ DP World Caucedo Port Charges, available at <https://en.caucedo.com/rates/port-charges/>; accessed July 29, 2017.

⁷ The length of a ship is usually referred to as LOA (length overall), as measured by the length of the vessel's parallel to the waterline.

hatch normally requires two lifts) for a total charge of \$240.⁸ Let's put these numbers into perspective. We make the following assumptions: the carrier company makes two calls per week, spends 24 hours or less at berth, and has one normal hatch move (meaning two lifts) per call. If charged, annual berthage costs would be just over \$137,000 each year, while hatch lift charges would be about \$25,000 each year. Berthage charges are far higher to the carrier than a hatch move charge, so the carrier still wins out.

In addition to hatch cover charges, there are other charges that some terminal operators like Sauté may apply in an effort to recover the cost of the berth discount. These include re-stow fees⁹, tally and data verification charges¹⁰, and berth reservation fees¹¹, which usually fall outside the norm of pricing practices in Latin America and the Caribbean. We acknowledge the possibility, however, that terminal operators may impose one or two such charges, but the Latin American and Caribbean experience shows very few terminal operators imposing all these charges.

Because of concerns about abusive pricing practices in oligopolistic environments, countries have turned to low-tariff bids as a bid criterion for concession award. The bid is normally tied to the total "all-in" charge for a basket of services defined by the government. The terminal operator offering the lowest all-in charge would be awarded the concession, with the all-in charge offered by the bidder serving as the maximum charge the concessionaire may impose for the life of the concession contract, though typically allowing for inflation-adjusted prices each year. Table I provides a summary of bid terms for relatively recent terminal concession programs; as the Table shows, there is a movement away from upfront payments (based on the highest bid to the government) to low-bid tariffs in an effort to control the costs to port users. Even in the case of Chile, where Table I indicates an upfront payment, these payments were stipulated as requirements in the bid terms, intended to finance retirement obligations of affected port authority workers from prior concession programs¹²; hence, because these payments were prescribed, and not a term to which bidders could bid, these payments were not a determinant of the

⁸ DP World Caucedo Stevedoring Public Tariffs, available at <https://en.caucedo.com/rates/maritime-public-tariffs/>; accessed July 29, 2017.

⁹ A re-stow is the process of removing a container from the allotted slot/cell to a temporary location elsewhere on the vessel and then moving it back. Generally, a re-stow occurs when a vessel has multiple ports of call and the containers have not been stowed in proper sequence with the ports of call. Some containers thus have to be moved temporarily moved to another location on the ship to allow access to the container that has to be discharged. After the targeted container has been discharged, then the re-stowed container is placed back into its original slot on the vessel.

¹⁰ This involves registering the identification number of each container discharged from the vessel. As this is done for the benefit of the terminal operator for invoicing purposes, it would normally be considered as a part of the container handling fee charged by the terminal operator.

¹¹ This charge is for reserving a time window for vessel arrival and departure from the berth. Ironically, berth reservation systems (usually referred to as berthing window system) are really intended to benefit the terminal operator to avoid risk of capacity shortages and congestion while maximizing revenue opportunities. Hence, carriers are likely to resist industry attempts to impose this charge. Though at least one terminal operator in Latin America has introduced this charge in its tariff, it has yet to impose this charge.

¹² "Ex trabajadores de Emporchi demandaron al Fisco por 33.000 millones de pesos," *Mercurio*, August 10, 2000.

outcomes of the tenders. Thus, the Valparaíso and San Antonio tender procedures are comparable to other ports in Table I.

Table I. Basis for Tender Award for Latin American Port Concessions

Port (Country)	Terminal Operator	Date of Concession	Upfront Payment Required	Basis for Tender Award
San Antonio (Chile)	Puerto Central	2011	\$25,000,000	Low tariff bid
Valparaíso (Chile)	OHL	2013	\$13,000,000	Low tariff bid
Cortes (Honduras)	ICTSI	2013	None	Per TEU fee for the government
Puerto Moín (Costa Rica)	APMT	2012	None	Low tariff bid, high canon for regional development, high labor assimilation
Lazaro Cardenas (Mexico)	APMT	2011	Prescribed upfront payment	Low tariff bid
Manta (Ecuador)	Not yet selected	NA	None	Low tariff bid, high investment offer, and high annual concession fee and canon
Pisco (Peru)	Consorcio Paracas	2014	None	Low tariff bid and high investment

Source: Authors' compilation from San Antonio: *Puerto Central Annual Report 2011*, p. 70; "Grupo Matte será uno de los tres mayores grupos portuarios del país," *Diario La Tercera*, May 6, 2011; Valparaíso: *Puerto de Valparaíso Annual Report 2013*, p. 133; "Chile: OHL gana concesión de la Terminal 2 de Valparaíso por US\$350M," *América Economía*, April 2, 2013; Cortes: "PUERTO CORTES Comunicado-Adjudicación-Terminal-de-Contenedores", p. 2; Puerto Moín: Decretos, Concesión de Obra Pública con Servicios Públicos para el Financiamiento, Diseño, Construcción, Operación y Mantenimiento de la Nueva Terminal de Contenedores de Moín, No-36443-MOPT-H (February 28, 2011) and No. 018-MOPT-H (March 1, 2011) (Exhibit 66); Lazaro Cardenas: "APILAC Auditoria 2012_0018_a Administración Portuaria Integral de Lázaro Cárdenas", p. 9; Manta: "Pliego de Selección Concurso Público Internacional para la Concesión de las Terminales de Contenedores y Multipropósito del Puerto de Aguas Profundas de Manta", p. 60; Pisco: "PISCO – OSITRAN ACTA DE APERTURA SOBRE 3 Y ADJUDICACION BUENA PRO," p. 3.

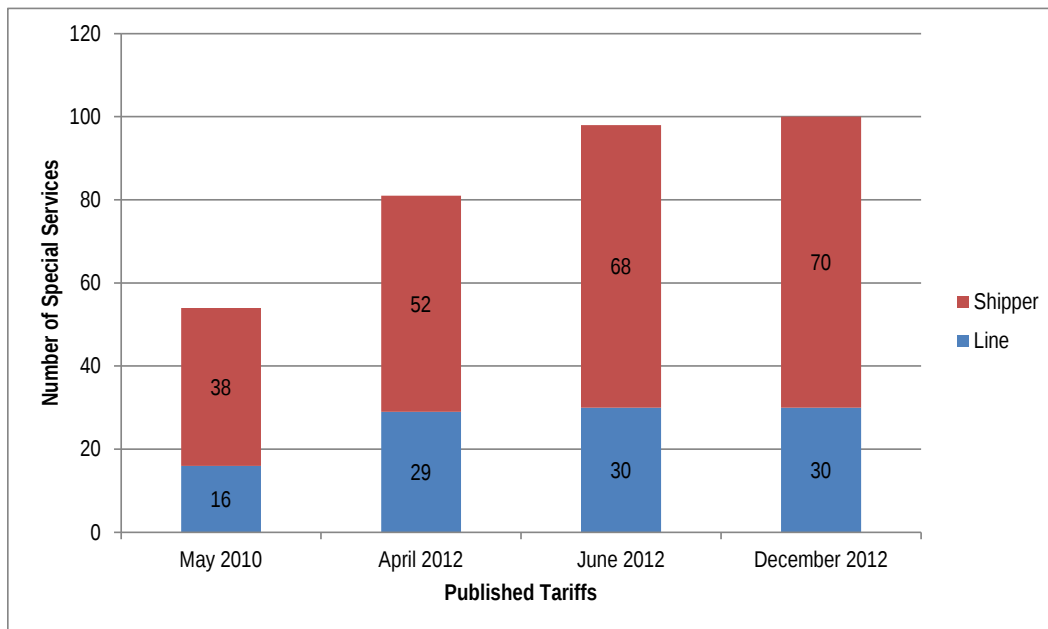
Because of the monopoly position of the future operator, the government has structured the bid terms on the basis of a low tariff bid from a maximum tariff in the bid terms. So this would set the pricing terms for the life of the concession for a basket of services, similar to what was discussed above. But the government needs to be aware of how operators can react to maximum price limits, usually looking for ways to generate more revenues through other services. So let's go back to our terminal operator Sauté.

To expand its business, Sauté decides to pursue another concession opportunity. Sauté's board members advise Sauté management this opportunity is a must-win bid and has instructed management to be aggressive in pursuing an award. Reflecting Table I's trends, this bid opportunity would consist of

a low-bid tariff format for award. As good companies do, Sauté's management conducts its due diligence on the opportunity. It examines the basket of services the government expects the operator to provide and the maximum all-in tariff within which the operator must cover the cost of its services. In reviewing the definitions of the all-in charges the government has provided in the bid terms, Sauté notices that this time the government has defined the basket of services to include hatch moves and re-stows. Sauté must now identify services not encumbered by the defined basket of services; in so doing, Sauté will determine how much potential revenue it can generate from services not bound by the basket of services. Sauté will prepare its financial spreadsheets, define services that it can provide that are not bound by the government's basket of services definition, and conduct a sensitivity analysis to determine the lowest price it can offer while still making reasonable profit, aided in large part from services not covered by the basket of services.

In fact, the results of this process can be seen from a real transaction experience in a South American port. Figure 6 tracks the number of items a terminal operator published in its published tariff for special services during its first 2.5 years of operation. At concession award, the operator had 54 different tariff items for special services, but at the end of the reporting period this had grown to 100, with the largest growth in services to shippers. These services, in fact, may be additional offerings that the basket of services does not cover. But the regulator must have a very tight definition of the basket of services to prevent operators from carving out a service from the basket and offering it as a separate service.

Figure 6. Number of Tariff Items Introduced Post-Concession Award



Source: Author's Research.

This behavior, in fact, has not escaped the concerns of some regulators. For example, Australia's Competition and Consumer Commission, which is charged with monitoring the pricing behavior and performance of terminal operators, monitors the use of such services and charges, acknowledging the risk that operators may be introducing unjustifiable fees imposed by terminal operators. In a recent report, the Commission calculated the proportion of non-standard services relative to standard services of Australia's container terminal operators was 18.5 percent.¹³

As Haiti will control pricing via a regulation-by-contract approach, it is imperative that it has clear definitions for the services encompassed in the basket of services. Service definitions should not only include what they cover, but also what they exclude. The intent is to reduce the operator's wiggle room for re-interpretation of the intended definition. Additionally, the terminal operators may in fact wish to offer other services that are legitimately separate from the basket of services. There should be a tariff review process in place that would confirm the proposed service is not covered by the service basket.

¹³Australian Competition and Consumer Commission, *Container Stevedoring Monitoring Report Number 10*, October 2013 (Exhibit 57).

<http://www.accc.gov.au/system/files/Container%20stevedoring%20monitoring%20report%20no.%2015%20-%20October%202013.pdf>.

2. ADJUSTING THE TARIFF

Following privatization of port services, some form of tariff regulatory control needs to be introduced to prevent any non-competitive behavior in a business environment dominated by a single or few service providers. The role of the regulator, then, should also focus on monitoring tariff levels and approving tariff adjustments for the regulated tariffs, and to some extent non-regulated tariffs. Here, we present a discussion of tariff adjustment methodologies to illustrate how regulators approach their regulatory function regarding tariff monitoring.

TARIFF ADJUSTMENT DETERMINANTS

The concession contract between the government and the concessionaire may set tariff ranges for a group of standard services. These standard services are defined by the regulator as the services whose prices are set in the concession contract and will be monitored to protect users against pricing abuses. All other services (the non-standard services) are set freely by the private operators or service providers.

Therefore, the beginning of a concession is seen as an instance when the tariff is “reset” and, disregarding how tariff items were estimated, port users and other stakeholders accept its “reasonableness”. However, port users want to be assured that two other key issues related to tariffs are also made clear: the tariff adjustment mechanism and the periodicity of the adjustments. The regulator is the entity that should define these procedures.

Tariff Adjustment Periodicity

The issue of tariff adjustment periodicity is less complicated than the tariff levels adjustment per se. After a concession or service contract enters in effect, a first period of stability should be granted (two to three years) where, if strictly needed, minor adjustments for inflation can be made annually.

Then, a periodic adjustment or tariff revision should be scheduled (three to five years) to analyze the continued relevance of having controlled tariffs and to assess an overall adjustment. The rationale is that tariffs cannot be static and should reflect market conditions. Two main issues need to be considered:

- Market dynamics could have changed:

- a more competitive environment is now in effect and a monopoly for providing a service is not prevalent anymore; or
- a less competitive environment has been created and a monopoly for providing a service is not prevalent anymore; and
- Productivity losses or gains could have changed the operators' profitability in such a way that tariff levels have to be increased or decreased to regain certain equilibrium between the market actors.

Tariff Level Adjustment

A common role for the regulator is to approve tariff adjustments. Tariffs adjustments are needed to adjust for inflation, for gained/lost efficiencies, or to cap tariffs set by the operators that risk being unjustifiably high. The objective is to maintain the market balance between reasonable profitability for the service providers and competitive prices for the users. The following discussion presents the main principles involved in these processes.

Tariff Adjustment for Inflation

The most common practice when adjusting tariffs is to account for inflation. Operators and regulators would have agreed to adjust periodically (often annually) current tariffs by reviewing local and/or foreign inflation indices. The most common international inflation index used is that of the United States. The adjustment factor is estimated by calculating the weighted average of the local and international indexes, with a higher factor applied to the international inflation index (e.g. $[0.8 \times \text{international inflation index}] + [0.2 \times \text{local inflation index}]$). Regionally, countries with recent concession contracts (starting in 2010) that specify an adjustment factor apply the adjustments automatically every year.

Tariff Adjustment by Calculating the Operator's Profitability

Regulating the profitability as measured by a service provider's Rate of Return (ROI) is common in utilities, but rarely applied in ports. The concept is quite straightforward: an abnormal profitability of a port operator indicates excessive tariffs in an environment of limited or no competition. Implementation of this concept is difficult because of two unrelated problems:

- a. required cost accounting system; and
- b. determining the "normal" rate of return.

Controlling ROI mandates an "open" accounting system, whereby providers allow the regulator access to its books. In some control systems the regulator mandates the use of a global standard accounting system, including the name, number and type of income / expense entry allowed in each account. In the most extreme cases, there are limits on expenses based on percentages of revenues, similar to those allowed by the Internal Revenue Service (income tax). For example, there are regulations to determine how depreciation is calculated and what car expenses are considered as legitimate. Implementation of such a system may first be cumbersome and costly to both providers and regulator (auditing).

But, even with a detailed accounting system, the determination of the allowed ROI (percentage) is a difficult figure to estimate. The price control system of electricity distribution and telecommunication, as well as that suggested for transport infrastructure like airports, employed the Capital Asset Pricing Model (CAPM) to determine the reference ROI. CAPM is a theory developed in the mid-1960s by three economists (Sharpe, Lintner and Treynor) in an attempt to link risk and return. Key assumptions underlying their theory are that the market is competitive and investors always hold efficient portfolios. Under these assumptions, a risky investment is expected to be compensated by a premium relative to its risk. The calculation of the expected return is based on a simple algebraic equation.

Unfortunately, while conceptually appealing, the CAPM has not performed well in recent years when capital markets have been undergoing wild fluctuations. This simplistic model could perhaps provide a good estimate for large and well-diversified segments of the market. However, using it to calculate a “fair” ROI for a specific investment, such as a highly-risky investment in a port project, is dubious at best. In any event, it cannot serve a regulator who needs to make a clear judgment regarding a presumably excessive profitability of a port operator.

Still, there are a few countries that have devised tariff adjustment procedures by using as an adjustment parameter the operator’s reasonable profitability. Elaborated analyses have been produced recently in Peru by the transport regulatory entity (OSITRAN) to adjust regulated tariffs for the two main container terminals in the country.

USER’S ROLE ON MONITORING TARIFFS

The participation of users is key to monitoring tariffs. The port authority should require service providers to install a mechanism to formally record and respond to complaints. This system will respond to complaints related to damages, invoicing, or other service related problems. Typically, such a complaint system is implemented by the operator through a Procedure Manual drafted by the operator (where it describes what the users have to do) and revised/approved by the regulator. The regulator can ask for periodic (quarterly, annual) summary reports that include statistics about all the cases so if a systemic problem exists it can be identified and addressed.

Some port systems have implemented, in the regulatory dynamic, the participation of users to monitor tariff increases. This “complaint based” procedure is structured from the requirements that all tariffs have to be public. That is, tariffs have to be filed with the regulator or its representative (local port authority). The regulator, in turn, will preliminarily review the suggested rates. Following this review, the new tariff will be posted for a preliminary probation period (e.g. 30 days). During this period both users and the regulator may disagree with the rates, demanding a close examination.

It is in this instance when the users can also participate. For that, the user or “complainant” should file an official complaint based on a written analysis and calculation along with his own suggested rates. The regulator then has to initiate an investigation following a written procedure. During the investigation the regulator may demand and obtain operational and financial data from the parties involved. If deemed

necessary, the regulator could even order a third party study. Such a lengthy process is the exception, however.

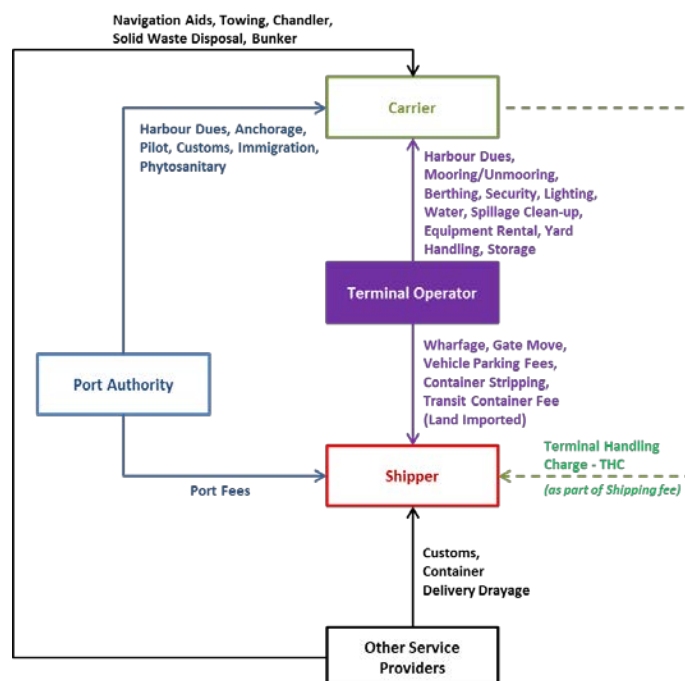
A tariff control system should be limited and geared toward handling exceptions. This approach is justified as the expected internal competition among operators should provide enough market pressure to generate competitive market prices.

3. APN TARIFF STRUCTURE

TARIFF STRUCTURE IN PORT AU PRINCE

As shown above, the charge flows pre- and post-privatization dramatically change. The terminal operator provides some of the services formerly provided by the port authority while other private parties may also be enlisted to provide other services. In Haiti, a charge flow structure can illustrate the division of responsibilities between APN and the terminal operator. Figure 7 reflects charge flows between APN, the Port Lafito operator, shippers, carriers, and other service providers. Table 2 identifies the parties that provide services and those that pay for services rendered, likely reflecting what can be expected for Cap Haitien's new container terminal. However,

Figure 7. Port Charges Flow in Port au Prince Marine Terminal



Source: Illustration prepared by author depicting the Port Lafito S.A. published tariff.

Table 2. Detail of Port Charges Flow at a Port au Prince Marine Terminal

TARIFF CATEGORY	SERVICE PROVIDER	SERVICE BENEFICIARY
Navigation Aid		
Light & Buoys	SEMANAH	LINER
Port Access		
Anchorage	APN	LINER
Port Authority Stamp Tax	APN	LINER
Harbour Dues - APN	APN	LINER
Harbour Dues - LAFITO	PLH-Concessionaire	LINER
Arrival / Departure - Clearance		
Launch Boat for Officials	APN	LINER
Immigration	APN	LINER
Quarantine & Phytosanitary Inspection	APN	LINER
Customs	APN	LINER
Pilot	APN	LINER
Pilot Association	APN	LINER
Towing	3RD PARTY	LINER
Berthing		
Mooring / Unmooring	PLH-Concessionaire	LINER
Berthing	PLH-Concessionaire	LINER
Security	PLH-Concessionaire	LINER
Lighting	PLH-Concessionaire	LINER
Cargo Import Customs Fees	AGD - Customs	CONSIGNEE
Port Fees - Cargo	APN	CONSIGNEE
Wharfage	PLH-Concessionaire	CONSIGNEE
Other Port Fees		
Chandler	3RD PARTY	LINER
Solid waste Disposal	3RD PARTY	LINER
Sludge Disposal	3RD PARTY	LINER
Bunker	3RD PARTY	LINER
Potable water	PLH-Concessionaire	LINER
Drinking Water	PLH-Concessionaire	LINER
Spillage Clean-up	PLH-Concessionaire	LINER
Stevedoring		
Equipment Rental	PLH-Concessionaire	3RD PARTY - OPERATOR
Container Ship	PLH-Concessionaire	LINER
Lo-Lo Vessel	PLH-Concessionaire	LINER
Bulk Vessel	PLH-Concessionaire	LINER
Tanker Vessel	PLH-Concessionaire	LINER
Ro-Ro Vessel	PLH-Concessionaire	LINER
Terminal Handling		
Reefer Maintenance	PLH-Concessionaire	LINER
Full Container Storage	PLH-Concessionaire	LINER
Empty Container Storage	PLH-Concessionaire	LINER
Detention Chassis	PLH-Concessionaire	LINER
Gate Move	PLH-Concessionaire	CONSIGNEE
Vehicle Parking Fees	PLH-Concessionaire	CONSIGNEE
Container Stripping	PLH-Concessionaire	CONSIGNEE
Warehouse Fees	PLH-Concessionaire	LINER
Empty Chassis Stacking for Export	PLH-Concessionaire	LINER
Container Delivery Drayage	Government	CONSIGNEE
Container Repair	PLH-Concessionaire	LINER
Land Imported Containers	PLH-Concessionaire	CONSIGNEE
Other Terminal Services	PLH-Concessionaire	3RD PARTY

Source: Port Lafito S.A.

TARIFF STRUCTURE IN CAP HAITIEN

The proposed concession structure for the Cap Haitien terminal¹⁴ follows the international practice for allocating revenues to the main service providers: the port operator, the port authority and other service providers. Tariffs to be charged by these service providers are clearly defined, including the procedures for their periodic adjustment. The following sections describe the proposed structure as well as the operator's payment obligations to APN for the right to operate the terminal.

Tariff Setting – Tariffs Charged by the Operator

Part D of the concession contract ("Financial Matters") sets forth the main parameters for collecting revenues (article 29.1). The tariffs collected by the operator are defined in Schedule (annex) I3 and the main items for container handling are presented in Table 3. These tariffs essentially reflect the basket of services referred to in Chapter 2. Other provisions included in this schedule are:

1. Container re-stow and hatch cover handling tariffs are determined by the Operator
2. Transshipment container handling tariffs are also determined by the Operator and do not require the port authority's approval
3. Tariff for rental of mobile cranes to third-party operators is set on the basis of hourly rental
4. Tariffs proposed to be charged by the Operator to users for additional services not specifically defined in the schedule have to be submitted to the Port Authority for approval
5. Discounts may be granted for business/commercial reasons in accordance with industry practices (volume discounts)

As noted in Chapter 2, container re-stows and hatch moves are not commonly charged in the Latin American/Caribbean region. Additionally, there is no distinction given for hatch moves at the request of the carrier and hatch moves that have to be done so that the terminal operator can access containers for which it will make revenue. So it is perplexing why the terminal operator will be given the authority to determine pricing for these services but for the carrier-requested hatch move or re-stow. Item 2 appropriately grants transshipment charge authority to the operator without APN approval as transshipment is highly competitive and, by definition, has no relation to the Haitian economy as domestic containers do.

As the mobile cranes will be owned by the terminal operator, it has the right to charge for its use by other parties. Additionally, APN approval for charges not addressed in Table 3 is appropriate, as are the references (item 5) to discounts. However, the terminal operator should only have the ability to provide discounts in a non-discriminatory fashion, as most antitrust frameworks reflect.

¹⁴ "Operation and Maintenance Contract for the Container Terminal of the International Port of Cap Haitien", English translation, Version 2.0, January 2017.

Table 3. Approved Maximum Tariffs for the Cap Haitien Container Terminal Operator

Tariff Description	Charge (USD)
Cargo Handling	
<i>Domestic Container Stevedoring (ship to shore to stack or vice versa)</i>	
Full Container Export	150.00
Full Container Import	220.00
Empty Container Export	120.00
Empty Container Import	120.00
<i>Crane Charges to Shipping Line</i>	
Crane Operator when using ships gear (one shift up to 8 hours)	300.00
Use of Shore Crane (per container [full or empty])	50.00
<i>Domestic Container Receipt or Delivery from truck</i>	
Full Container Export	75.00
Full Container Import	110.00
Empty Container Export	60.00
Empty Container Import	60.00
<i>Vehicle Stevedoring (ship to shore to stack or vice versa)</i>	
Automobiles	100.00
Trucks	200.00
Buses	250.00
Heavy Equipment	300.00
Container Storage in Port (all charges per calendar day)	
<i>Full Container</i>	
Day 1 to 15	Free
As from day 16 (per TEU per day or part thereof)	20.00
<i>Empty Container</i>	
Day 1 to 15	Free
As from Day 16 (per TEU per day or part thereof)	15.00

Schedule 13 also includes provisions for the tariff adjustments. Annual adjustments are permitted in accord with inflation. Such adjustments will be made using a straightforward procedure as set forth in the “Automatic Tariff Revision” provisions and using an “Indexation Coefficient” based on the price index for services related to operation of port waterfront terminals (commodity code 3112) based on the United States Department of Labor’s Producer Price Index Detailed Report. Key provisions include:

1. Tariffs shall be revised automatically each year on the anniversary of the concession contract’s Effective Date; this anniversary defines the “Automatic Tariff Revision Date”
2. The Operator presents to the Port Authority at least three months before the occurrence of the Automatic Tariff Revision Date (but not earlier than four months before such date) an "Automatic Tariff Revision Notice"
3. This notice is submitted to the Port Authority accompanied by sufficient supporting evidence to verify the Operator's calculations
4. Approval of the new tariffs should be done within 22 business days of receipt of the notification
5. In case that the Port Authority disagrees with the revised tariffs, it has to submit the calculation of the revised tariffs following Schedule 11’s Dispute Solution Procedure within 22 business days of receipt of the notification
6. If the Port Authority does not take any action within the 22 day period after receiving the adjustment notification, the requested tariff adjustment will be deemed accepted
7. The Operator has to make public the new tariffs in accordance with standard industry practices

These provisions are in accord with acceptable tariff adjustment practices.

Tariff Setting – Tariffs Charged by the Port Authority

Part D of the concession contract “Financial Matters” also defines the tariffs to be collected by APN (article 29.2). The concession contract states that the Port Authority “reserves the right, but not the obligation, to collect, directly or indirectly, the tariffs, fees and charges enumerated in Schedule 13, Tariffs, Fees and Charges Payable by Terminal Users”. The applicable tariffs, fees and charges have to be published by the Port Authority in a format that is accessible by port users at all times; this would normally be done as part of the operational regulations issued by a port authority and made available on the port authority website. These tariffs, as presented in Tables 4 and 5, are categorized as follows:

- Services provided in the port marine domain, outside the terminal for non-cargo-handling activities; charges are based on ship’s characteristics (GRT, draft, length of stay in the port area)

Table 4. Tariffs to be Assessed on a ship-basis by the Port Authority in Cap Haitien

Tariff	Charge Unit
Port Fees	Per GRT (Gross Register Tonnage)
Pilotage (tariffs categorized by vessel size defined on the basis of GRT	Per draft

Anchorage	Per day
Mooring	Per GRT per day

Table 5. Tariffs to be Assessed on a cargo-unit-basis by the Port Authority in Cap Haitien (levy on goods)

Tariff	Charge Unit
Royalty on import containers (export containers are excluded)	Per TEU
Royalty on non-containerized goods	Per metric ton
Royalty on vehicles	Per cubic meter

- Rights for use of the port's land domain; charges are based on cargo volumes (levy or royalty on goods)
- Long term storage for vehicles in the port area (after the grace period of 15 days)

Another tariff that can be collected by the port authority is for vehicle storage (small and large cars, jeeps, vans, mini trucks, trucks, buses). The port comprises more areas than the container terminal and some of these areas can provide storage space in case units cannot clear the port within the 15-day grace period.

Other government entities (Service Maritime et de Navigation de Haïti – SEMANAH, or the Administration Générale des Douanes) set and collect directly tariffs, fees and charges from the port users (shipping lines and cargo owners).

The procedure for port authority tariff adjustment is clearly stated in the concession contract, though there is no provision for periodic adjustments. A key principle for tariff adjustment is stated repeatedly: maintaining the cost competitiveness of the port with respect to its regional competitors. An important stipulation, however, is that APN is prohibited from increasing container charges during the life of the concession, though it may decrease them based on competitive concerns. This would suggest that APN will undertake periodic benchmarking and may increase (for non-containerized goods) or decrease (for both non-containerized and containerized goods) its tariffs based on the benchmarking exercise. Main provisions include:

- Give the Operator “sufficient notice”¹⁵

¹⁵ “Sufficient notice” is not specifically defined in the contract; it can be assumed that a reasonable period is at between three to four months, a similar period required for communicating the automatic adjustment of the operator's tariffs before the effective date of the tariffs adjustment.

- Tariffs to users for non-containerized cargo may be changed from time to time in accordance with APN tariff policies, and without adversely affecting the cost competitiveness of the Port with respect to regional competitors; the Port Authority will give the Operator sufficient notice
- Tariffs charged to users for containerized cargo may not be increased over the term of the concession, although they may be decreased in accordance with the Port Authority tariff policies; the Port Authority will make an effort to reduce these tariffs during the term of the contract to contribute to the cost competitiveness of the Port
- No other categories of tariffs that are charged per container shall be created during the term of the concession
- The Port Authority may choose to adjust the royalty on import containers by levying export containers to offset the loss of revenues collected by the Port Authority

While port competitiveness appears to be the guiding principle for tariff revisions, APN will need the ability to gauge the impact of revisions on its financial flows. This can be done through the use of the tariff analysis tool discussed later.

Tariff Setting – Fees Collected by the Port Authority from the Port Operator

The contract defines the royalties that the Operator will pay to the Port Authority for the concession:

- A Fixed Royalty of US\$60,000 per year
- A Variable Royalty on a per moved cargo unit basis; the royalty per TEU moved is proposed by each bidder

The royalties will be adjusted annually by the price index for services related to operation of port waterfront terminals (commodity code 3112) based on the US Department of Labor's United States Producer Price Index Detailed Report.

4. TARIFF ANALYSIS TOOL

The purpose of the Tariff Analysis Tool is to enable APN to test the effects of tariff adjustments to port authority tariffs on APN cash flows. The Tool provides a systematic simulation of the cash flows generated by APN. It is composed of a dashboard that enables the Tool user to develop multiple tariff and traffic demand scenarios and change operational assumptions - representing major determinants or components of the APN's financial flows. Revenues can be modified to reflect changes in APN's port tariffs as well as other revenue sources. Similarly, the effect of changes in macroeconomic factors, demand forecasts, and capital (CAPEX) and operating (OPEX) expenses can be illustrated in the pro forma financial statements, generating income statements and cash flow statements in accord with changing assumptions.

The user can also test the effects of incorporating tariff levels of non-Haitian port authorities to gauge the impact on APN's financial performance if it matched the tariffs of benchmark ports in order to remain competitive. For example, in a scenario where non-Haitian Port A, which handles some Haitian cargoes, charges lower port authority fees than those of APN, then the user can change the Tool's spreadsheet to reflect Port A's port authority charges. This will allow the user to observe the impact on APN financial performance if port authority tariffs are adjusted to reflect competing port authority charges in a rival port.

The tariff tool is structured to reflect the terminal operator's concession contract payment terms, in this case, the one expected for the port of Cap Haitien. As is typical for port concession contracts, this encompasses fixed and variable fee revenues that are generated for APN. The fixed fee comprises the annual lease payment to APN by the terminal operator holding the concession. The variable fee consists of a royalty payment paid to APN based on a per unit charge for cargo handled. For example, there is a royalty payment paid by the terminal operator per container handled in the terminal, in this case on a per TEU basis. As the terminal operator may also serve non-containerized cargoes, such as bulk and breakbulk cargoes, there is also a royalty payment paid to the port authority on each ton of cargo handled. As the Cap Haitien concession represents the first port concession of public facilities in Haiti, it is expected that future concession contracts will reflect similar payment terms.

There are also charges not now imposed by APN that are imposed by port authorities in other countries. These include security surcharges as well as miscellaneous charges related to services the port authority provides. While these charges are not currently imposed in Haiti, the Tool allows the

user to incorporate such charges in the event APN decides to impose them in future years. Additionally, as earlier noted, the Tool allows for assessing the impact on APN's financial performance if APN adopts the port authority tariffs applied in other countries. So the user can input such charges in the Tool.

As in all Excel-based spreadsheets, the Tool also allows the user to create a number of “what if” scenarios. The Tool provides for the use of five different scenarios, four of which are based on the structure of Scenario 1, which forms the base case scenario. All five scenarios reflect seven general categories of port authority charges (fixed and variable and hence revenue sources for APN). Scenarios 2-5 reflect percentage adjustments, up or down, from Scenario 1's base case. While the Tool shows five Scenarios to select from, the user can assign a different Scenario to each of the seven categories of port authority charges. Additionally, port authority revenues are affected by both the level of charges imposed by the port authority as well as cargo and ship volumes handled. Hence, the Tool also allows for adjustments to demand forecasts using three different demand scenarios. Altogether, the user has the possibility of testing nearly 235,000 different configurations and potentially exponentially more given the ability to “hard code” other numbers in a custom run of the model.

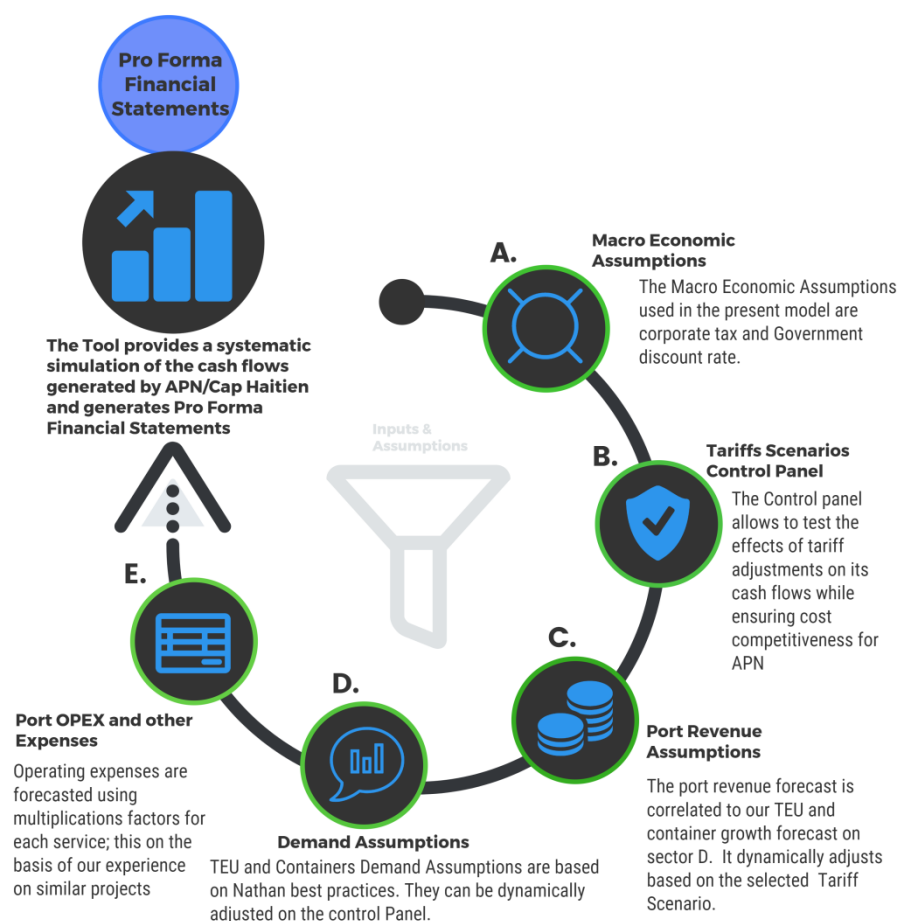
INPUT COMPONENTS OF THE TOOL

The Tariff Analysis Tool structure is depicted in Figure 8. It is composed of six components that together will generate port authority financial performance. These components are found in the Tool's first worksheet (WS1 – INPUTS). The six components include:

Part A. Macroeconomic Assumptions. Macroeconomic inputs refer to corporate tax and the government's discount rate. The prevailing rates in Haiti are 30% for the corporate tax rate and 12% for the government discount rate. But the user has the ability to change these as desired.

Part B. Revenue Scenarios. This Part enables the user to test the effects of revenue adjustments, relative to fixed, variable, and other charges, on APN's cash flows based on the Scenario the user configures. The user can select a Scenario among the Tool's pre-configured scenario options, or build a customized one based on the user's own changes relative to the seven categories of port authority charges.

Part C. Port Revenue Forecast. The port revenue forecast is tied to Part D's TEU and container growth forecasts as well as the user's selected (or configured) revenue scenarios. Hence, the revenues depicted in the Tool change when selecting a Revenue Scenario in Part B or developing a customized one. Forecasted revenues are based on the terminal operator's fixed and variable charges as well as revenues generated from services provided by the Port Authority, such as Tug Assist, Channel Access, and Navigation Aids. Part C is the only one of the six components that does not require input from the

Figure 8. Input Components of the Tool for Generating Tool Output Components

Source: Nathan Associates

user, as inputs are automated based on the inputs made by users in the other parts. However, the user can still make hard entries in Part C if so desired.

Part D. Demand Forecasts. The Container Demand Forecast Growth Scenario selected by the user in Part B is reflected over a 20-year forecast horizon in Part D. Containers (in TEUs) and non-containerized cargo (in tons) forecasts are generated. Based on expected vessel size and capacity, the model calculates the number and size (length overall – LOA) of vessels that will carry the forecasted cargo volumes as the port authority generates revenues from vessel activity in the form of Channel Access fees, Navigation Aids charges, and the earlier noted Security and miscellaneous fees that port authorities normally charge.

Part E. Port Operating Expenses. Operating expenses are day-to-day expenses that are incurred by the port authority. Operating expenses include everything from employee salaries (including compensation, pension and benefits costs for employees in administration, security, operational

supervision, etc.) to office supplies, utility costs, facility and equipment maintenance, consulting services, and telecommunications (e.g. phone and internet services). Note that the numbers escalate each year assuming the use of consumer price index or other cost escalation indices that the user may wish to use. While such expenses were not readily available from APN, we have provided numbers that serve as “placeholders” for more accurate numbers that APN can generate for incorporation into the Tool.

Part F. Port Capital Expenses. Capital expenses refer to payments made by the port authority to provide or improve long-term capital assets. This would include port terminal infrastructure and equipment. An investment in capital assets adds to the value of the port authority business. While this increases the value of the port authority’s net worth, the expense associated with a capital investment also increases the port authority’s liability. Additionally, because capital investments lose value over time, they reduce the port authority’s value, which is reflected in depreciation. This loss of value (depreciation) is capitalized over a period of time equal to the expected or useful life of the capital asset. The Tool separates capital expenses by infrastructure and equipment assets. As APN is receiving a grant to cover Cap Haitien’s port capital asset improvements, capital asset expenses would not be shown here; however, for purposes of demonstration, the Tool shows a terminal investment of \$20 million and an equipment investment of \$1.5 million. These capital expenses in turn are depreciated annually over the useful life of the asset, in this case 20 years each, as the Tool shows.

OUTPUT COMPONENTS OF THE TOOL

The Tool’s principal output consists of APN’s pro forma financial statements, as generated in the second worksheet (WS2 – Financial Performance) and graphical depictions of the financial results (WS3 – Graphical Depictions). Pro forma financial statements are intended to depict a reasonably accurate portrayal of a port authority’s financial situation if prevailing trends continue or if certain assumptions hold true. As noted earlier, pro forma financial statements can also be used to gauge the effects of “what if” scenarios by changing certain assumptions, which reflect possible events that have a potential effect on the port authority’s financial outcome.

Normally, there are three primary financial statements composed in pro forma financial statements, including 1) the balance sheet, which depicts the port authority’s assets, liabilities, and net worth; 2) the income statement (or profit and loss statement), which reflects an itemization of revenues and expenses and provides insight on what can be done to improve the bottom line, and 3) the cash flow statement, which shows cash inflows and outflows caused by the port authority’s activities during a stated period. For our purposes here, the balance sheet is omitted from the Tool as there was insufficient information available to generate one that is reasonably reflective of the Cap Haitien situation.

As noted, the pro forma financial statements are reflected graphically in the Tool’s third worksheet, WS3 – Graphical Depictions. Here, the Tool generates graphics depicting income and cash flow statements. We also include a depiction of EBITDA (Earnings Before Interest, Taxes, Depreciation, and Amortization) drawn from the WS2 – Financial Performance worksheet. Some financial analysts believe that EBITDA is a more accurate reflection of an entity’s financial health as non-cash expenses do little to

say about the actual cash flows of an entity. On the other hand, the use of EBITDA can also disguise financial risk and for this reason is not included as a part of the Generally Accepted Accounting Principles (GAAP) standards and procedures that entities follow in compiling their financial statements. However, EBITDA, along with other financial statements, are useful when presenting the full picture of an entity's financial health.

INSTRUCTIONS ON THE USE OF THE TOOL

As earlier noted, the Tool is built using Excel. We color coded (Figure 9) the tool to indicate cells that require input and cells that consist of formulas that are applied as the user's inputs change. User inputs are sought only in the green cells, though as earlier noted the user has the option for hard entry of data in blue cells or, alternatively, the user can change the formulas. However, whether changing inputs, making hard entry inputs in blue cells, or changing formulas, the user is strongly advised to save a new file to preserve the integrity of the inputs and formulas of the Tool's original file. Note also that all cells indicating currency are in US dollars, with 2017 representing the base year.

Figure 9. Color Codes for Inputs and Formulas

Tariff Analysis Tool - Haiti Port Project				
Denotes Input	Denotes Formula	in USD	Base Year	2017

Source: Nathan Associates, Tariff Analysis Tool.

Tool Inputs

Macroeconomic Assumptions

The Tool's Part A. Macroeconomic Assumptions of WS2 – Financial Performance allows the user to adjust corporate tax assumptions and the discount rate used to calculate the present value (PV) in the Income and Cash Flow statements in WS2 – Financial Performance. Generally, PV measures profit that is determined by subtracting the present values of cash outflows from the present values of cash inflows over a time horizon. This is not to be confused with net present value (NPV). Both PV and NPV use discounted cash flows to estimate the ongoing value of future income, but the NPV calculation includes the initial capital investment for an infrastructure project, subtracting this value from the discounted revenue.

The user can change the assumed rates in the green cells in Part A. Macroeconomic Assumptions in WS – Inputs, as shown in Figure 10. Once these rates are set by the user, they are automatically carried into adjacent cells for the entire 20-year financial performance horizon.

Figure 10. Macroeconomic Assumptions section

PART A. MACROECONOMIC ASSUMPTIONS		
(all numbers in USD)		
	2017	2018
	1	2
Marginal rate of corporate tax	30.00%	30.00%
Government discount rate	12.00%	12.00%

Source: Nathan Associates, Tariff Analysis Tool

Revenue Scenarios

The Tool allows the user to select a Revenue Scenario in Part B of WSI – Inputs. As earlier noted, the user can select a Scenario by inputting scenario numbers in the green cells under each of the seven revenue categories (Figure 11). The user need not select the same scenario for each revenue category. In Figure 11, for example, the user may select scenario 1 for fixed annual fees, 2 for variable fees, 5 for security, and so on.

Figure 11. Revenue Scenario Section

Concession Contract Base Scenario 1			APN Active Tariff Scenario						
Base			1. Fixed Annual Fee	2. Variable Fee - Containers (per TEU)	3. Variable Fee - Other Cargo (per ton)	4. Tug Assistance (per vessel)	5. Channel Access	6. Navigation Aids	7. Security
Scenario 2	Base + 15 %	2	1	1	1	1	1	1	1
Scenario 3	Base + 20 %	3							
Scenario 4	Base -15 %	4							
Scenario 5	Base -20 %	5							

Source: Nathan Associates, Tariff Analysis Tool

Figure 12, copied from Part B of WSI – Inputs, illustrates the impact of the scenario selection on concession fee revenues and revenues from port authority-provided services. For comparison purposes, the impact of other selected scenarios is also shown in the green cells; and, because these cells are green, the user can input any percentage as desired to create more aggressive or conservative scenarios and assess sensitivity in accord with the user’s “customized inputs” on these revenue sources.

Revenues are affected by the volume of cargo and vessels handled in the terminal or port as the port authority applies charges based on volumes. For example, assuming the same container surcharge is continuously applied over the coming years, the total revenue from a \$10 surcharge per TEU of 20,000 TEUs handled in year 1 would certainly be less than the same \$10 surcharge per TEU of 30,000 TEUs handled in year 5. So, we designed three scenarios that the user can select in the Container Demand Forecast and Non-Containerized Cargo Demand portion of Part B. Revenue Scenarios. The user can select one of three container (TEU) growth scenarios (10 percent, 6 percent, and 3 percent) and one of three non-containerized cargo (tons) growth scenarios by coding 1, 2, or 3 in the cells to the right of the Active Scenario cell (indicated by the red circles in Figure 13).

Figure 12. Revenue Impact of Scenario Selection

ACTIVE SCENARIO		1	2	3	4	5
Contract			15 %	20 %	-15 %	-20 %
1. Fixed Annual Fee		\$ 60,000.00	\$ 60,000.00	\$ 69,000.00	\$ 72,000.00	\$ 51,000.00
						\$ 48,000.00
ACTIVE SCENARIO		1	2	3	4	5
Contract			15 %	20 %	-10 %	-15 %
2. Variable Fee - Containers (per TEU)		\$ 10.00	\$ 10.00	\$ 11.50	\$ 12.00	\$ 8.50
						\$ 8.00
ACTIVE SCENARIO		1	2	3	4	5
Contract			15 %	20 %	-10 %	-15 %
3. Variable Fee - Other Cargo (per ton)		\$ 1.00	\$ 1.00	\$ 1.15	\$ 1.20	\$ 0.85
						\$ 0.80
ACTIVE SCENARIO		1	2	3	4	5
Contract			15 %	20 %	-10 %	-15 %
4. Tug Assistance (per vessel)		\$ 3,000.00	\$ 3,000.00	\$ 3,450.00	\$ 3,600.00	\$ 2,550.00
						\$ 2,400.00
ACTIVE SCENARIO		1	2	3	4	5
Contract			15 %	20 %	-10 %	-15 %
5. Channel Access PER METER		\$ 0.50	\$ 0.50	\$ 0.58	\$ 0.60	\$ 0.43
						\$ 0.40
ACTIVE SCENARIO		1	2	3	4	5
Contract			15 %	20 %	-10 %	-15 %
6. Navigation Aids PER SHIP		\$ 500.00	\$ 500.00	\$ 575.00	\$ 600.00	\$ 425.00
						\$ 400.00
ACTIVE SCENARIO		1	2	3	4	5
Contract			15 %	20 %	-10 %	-15 %
7. Security PER TEU		\$ 5.00	\$ 5.00	\$ 5.75	\$ 6.00	\$ 4.25
Other fees PER TEU		\$ 10.00	\$ 10.00	\$ 11.50	\$ 12.00	\$ 8.50
						\$ 8.00

Source: Nathan Associates, Tariff Analysis Tool

Figure 13. Container (in TEUs) and Non-Containerized (in tons) Demand Forecast Scenarios

Containers Demand Forecast (TEU)			Non-Containerized Cargo Demand Forecast		
Domestic	Active Scenario	1	Domestic	Active Scenario	1
Growth Scenario 1	<i>Scenario 1</i>	10%	Growth Scenario 1	<i>Scenario 1</i>	2%
Growth Scenario 2	<i>Scenario 2</i>	6%	Growth Scenario 2	<i>Scenario 2</i>	4%
Growth Scenario 3	<i>Scenario 3</i>	3%	Growth Scenario 3	<i>Scenario 3</i>	6%

Source: Nathan Associates, Tariff Analysis Tool

Port Revenue Forecasts

Part C. Port Revenue Forecasts (Figure 14) are provided in WSI – Inputs to allow the user to immediately observe the impact of the user’s input assumptions. Note that for space considerations in this Instruction Manual, Figure 14 depicts only a portion of Part C. Port Revenue Forecasts’ 20-year time horizon. Part C. Port Revenue Forecasts relies on automated inputs from Part B (see Figure 12) in

Figure 14. Part C's Port Revenue Forecasts

PART C. PORT REVENUE FORECASTS							
		2017	2018	2019	2020		
Concession Fess		UNIT					
Fixed Annual Fee	FIX	FEES					
Variable Fee - Containers	PER TEU	\$ 60,000.00	\$ 60,000	\$ 60,000	\$ 60,000		
Variable Fee - Other Cargo	PER TON	\$ 10.00	\$ 200,000	\$ 220,000	\$ 242,000		
		\$ 1.00	\$ 100,000	\$ 105,000	\$ 110,250		
			\$ 115,763				
Services APN		UNIT					
Tug Assistance (per vessel)	PER VESSEL	\$ 3,000.00	\$ 350,000	\$ 377,500	\$ 407,375	\$ 439,844	
CHANNEL ACCES	PER METER	\$ 0.50	\$ 11,667	\$ 12,583	\$ 13,579	\$ 14,661	
NAVIGATION AIDS	PER VESSEL	\$ 500.00	\$ 58,333	\$ 62,917	\$ 67,896	\$ 73,307	
SECURITY	PER TEU	\$ 5.00	\$ 100,000	\$ 110,000	\$ 121,000	\$ 133,100	
OTHER	PER TEU	\$ 10.00	\$ 200,000	\$ 220,000	\$ 242,000	\$ 266,200	
OTHER REVENUES APN		1,080,000	1,168,000	1,264,100	1,369,075		

Source: Nathan Associates, Tariff Analysis Model

regards to the user's selected Revenue Scenarios for concession-related fees (fixed fees and variable fees) and for APN-provided services. Part C. Port Revenue Forecasts is also dependent upon the Part D. Demand Forecasts (discussed next) and provides inputs needed for WS2 – Financial Performance.

Demand Forecasts

Part D. Demand Forecasts of WSI – Inputs reflects the results of the user's container growth scenario selection made in Part B. But the user can also input its own estimates for the number of containers as indicated by the green (user input) cells (Figure 15). The user can also change the number of vessels and their length overall (LOA). The number of vessels is used to estimate the average volume of containers (in TEUs) handled per call; Part D. Demand Forecasts automatically calculates the average container volume per call by dividing the number of TEUs by the number of ships to generate annual TEU volume for the 20-year forecast horizon. Similarly, the average loaded or discharged volume of non-containerized cargoes is calculated by dividing the forecasted cargo volume (in tons) by the number of vessels. The user can also change the growth rate and base case volume for non-containerized cargo growth. Part D's forecasts are then used as inputs to Part C's revenue forecasts.

Port Operational Expenses

Port authorities in exercising their roles in port administration, maintenance, and service provision incur annual operating expenses that have ramifications on their financial performance. These expenses are identified in Part E. Operational Expenses. While port authorities in general may differ in the range of operational expenses they incur, experience shows that the expenses enumerated in Figure 16 are broadly representative of the vast majority of operational expenses. These include expenses associated with payroll costs for port administration, maintenance, security, and tug assist, which are personnel functional areas generally representative of Cap Haitien. Additionally, we reflect a host of other non-payroll related operational expenses normally incurred by port authorities, including utilities (water supply, electricity, telephone), office supplies and expenses, facility and equipment maintenance supplies,

Figure 15. Part D Demand Forecasts

PART D. DEMAND FORECASTS				
	2017	2018	2019	2020
Containers Demand Forecast (TEU)				
Domestic	20,000	22,000	24,200	26,620
Growth Scenario 1	20,000	10%	10%	10%
Growth Scenario 2	20,000	6%	6%	6%
Growth Scenario 3	20,000	3%	3%	3%
Total Containers (TEUs)	20,000	22,000	24,200	26,620
Number of Vessels				
LOA (m)	300	67	73	81
	200	13,333	14,667	16,133
General Cargo Demand Forecast (Tons)				
Domestic	5%	100,000	105,000	110,250
Transit				115,763
Total Cargo (Tons)		100,000	105,000	110,250
Number of Vessels	2,000	50	53	58
LOA (m)	200	10,000	10,500	11,576

Source: Nathan Associates, Tariff Analysis Model

Figure 16. Port Authority Operational Expenses

PART E. OPERATIONAL EXPENSES				
TRAFFIC AND TERMINAL AREA FACTORS FOR EXPENSES	2017	2018	2019	2020
C1- EXPENSES CALCULATIONS				
Port Authority Total Annual Payroll	\$ 193,000	\$ 198,790	\$ 204,754	\$ 210,896
Port Administration	\$ 80,000	\$ 82,400	\$ 84,872	\$ 87,418
Maintenance crews and supervisor	\$ 35,000	\$ 36,050	\$ 37,132	\$ 38,245
Security	\$ 45,000	\$ 46,350	\$ 47,741	\$ 49,173
Tug assist	\$ 33,000	\$ 33,990	\$ 35,010	\$ 36,060
Pension and other benefits				
	assumed factor = 22% of total APN/Cap Haitian Payroll			
	\$ 42,460	\$ 43,734	\$ 45,046	\$ 46,397
Payroll taxes				
	assumed factor = 8% of total APN/Cap Haitian Payroll			
	\$ 15,440	\$ 15,903	\$ 16,380	\$ 16,872
Other Operating Expenses	\$ 31,700	\$ 32,651	\$ 33,631	\$ 34,639
Water supply	\$ 1,000	\$ 1,030	\$ 1,061	\$ 1,093
Electricity	\$ 15,000	\$ 15,450	\$ 15,914	\$ 16,391
Telephone	\$ 4,000	\$ 4,120	\$ 4,244	\$ 4,371
Office supplies and expenses	\$ 1,200	\$ 1,236	\$ 1,273	\$ 1,311
Facility and equipment maintenance supplies	\$ 7,000	\$ 7,210	\$ 7,426	\$ 7,649
Advertising and promotion	\$ 2,000	\$ 2,060	\$ 2,122	\$ 2,185
Other expenses	\$ 1,500	\$ 1,545	\$ 1,591	\$ 1,639
Inflation Factor	3%			
OPERATING EXPENSES (USD) (APN)	\$ 291,078	\$ 299,810	\$ 308,805	\$ 318,069

Source: Nathan Associates, Tariff Analysis Model

and advertising and promotion. We have also included an “other expenses” items that port authorities may incur that cannot be apportioned to the other operational expense categories. As shown in Part E.

Operational Expenses, the user has the ability to insert these costs directly. Additionally, we assume an inflation adjustment factor of 3 percent.

Port Authority Capital Expenses

As a landlord port authority, APN is responsible for development of common access areas. Common access areas are places within the port area to which many port users have the right to use. In most ports, such areas include truck and passenger car parking, perimeter gates, public use berths, common use storage areas, navigation channels, and breakwaters. In some ports, there may also be common access equipment; for example, the port authority may provide a crane that can be used by licensed stevedores. This is distinguished by concessioned terminals, where the terminal operator and its personnel normally have sole access to fixed and mobile assets within the confines of the terminal.

To accommodate the possibility that APN will make investments in common access areas in future years, we have incorporated Part F. Capital Expenses in WSI – Inputs (see Figure 17). Part F distinguishes between Fixed Assets and Mobile Assets. Fixed Assets usually refer to infrastructure and installations (things that cannot be moved), while Mobile Assets refer to equipment, such as cranes and tug boats. As shown in Figure 17, there is also a provision for asset depreciation. Depreciation allows the port authority to reallocate the cost of a capital asset over its useful life. This effects the net income that is reported as it becomes an expense each year for the time the asset is being depreciated. In our case here, we assume capital assets to have useful lives of 20 years. Hence, Figure 17 shows a depreciation expense for each year over a 20-year period for both fixed and mobile assets. As currently configured, the user can input additional capital asset investment, both fixed and mobile, in the green cells over the time horizon.

Tool Outputs

Outputs reflecting user assumptions are located in three areas of the Tool. In WSI – Inputs, we have provided the user with three graphs (Figure 18) to allow for an instantaneous “snapshot” of user input changes without having to go back and forth to another worksheet where the same information is also provided. Additionally, WSI – Inputs also generates a port revenue forecast table, shown earlier in this Instruction Manual in Figure 14.

The second location of outputs is WS2 – Financial Performance. This worksheet encompasses the pro forma financial statements, with outputs provided graphically and in table formats (Figure 19). User inputs made in WSI – Inputs are reflected in the generation of the Profit and Loss (P&L) and Cash Flow statements. The present value (PV) is calculated at the end of the table’s time horizon. Note, unlike the Tool, Figure 19 does not display each year of the time horizon reflected in the actual Tool; some years are omitted here to be able to display the Figure.

The third location of outputs is WS3 – Graphical Depictions, which present graphical displays for EBITDA, Net Income (P&L), and Cash Flow results (Figure 20). These are provided here so that the

user can readily copy and paste the graphics in other documents. The user also has the option of copying the same graphics from WS1 – Inputs and WS2 – Financial Performance.

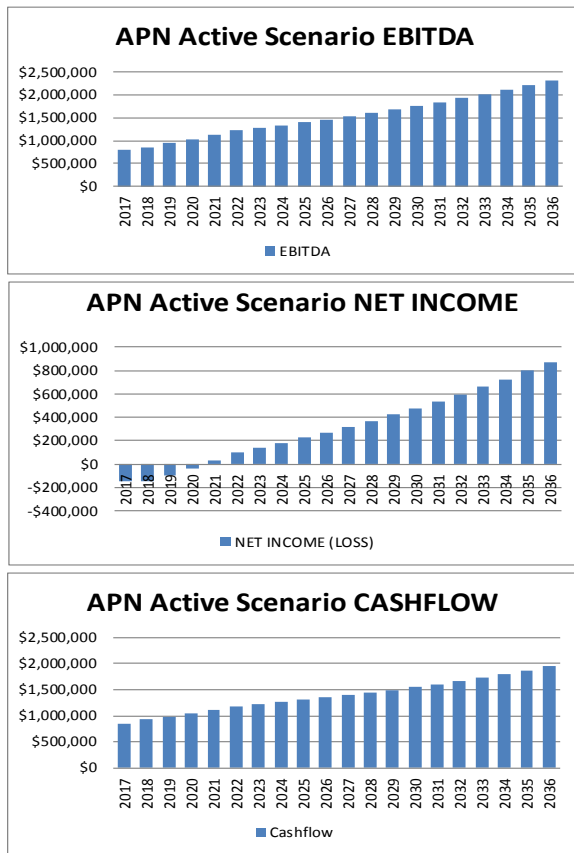
Figure 17. Port Authority Capital Expenses

PART F. CAPITAL EXPENSES

		CAPEX	Year	2017	2018	2019	2020
FIXED ASSETS		20,000,000		\$ 20,000,000.00		-	-
Total		20,000,000		20,000,000	-	-	-
	Years						
1	20	20,000,000	2017	1,000,000	1,000,000	1,000,000	1,000,000
2	20	-	2018		-	-	-
3	20	-	2019			-	-
4	20	-	2020				-
5	20	-	2021				
6	20	-	2022				
7	20	-	2023				
8	20	-	2024				
9	20	-	2025				
10	20	-	2026				
11	20	-	2027				
12	20	-	2028				
13	20	-	2029				
14	20	-	2030				
15	20	-	2031				
16	20	-	2032				
17	20	-	2033				
18	20	-	2034				
19	20	-	2035				
20	20	-	2036				
Annual Depreciation		20,000,000		1,000,000	1,000,000	1,000,000	1,000,000
		CAPEX	Year	2017	2018	2019	2020
MOBILE ASSETS		1,500,000		\$ 1,500,000.00		-	-
Total		1,500,000		1,500,000	-	-	-
	Years						
1	20	1,500,000	2017	75,000	75,000	75,000	75,000
2	20	-	2018		-	-	-
3	20	-	2019			-	-
4	20	-	2020				-
5	20	-	2021				
6	20	-	2022				
7	20	-	2023				
8	20	-	2024				
9	20	-	2025				
10	20	-	2026				
11	20	-	2027				
12	20	-	2028				
13	20	-	2029				
14	20	-	2030				
15	20	-	2031				
16	20	-	2032				
17	20	-	2033				
18	20	-	2034				
19	20	-	2035				
20	20	-	2036				
Annual Depreciation		1,500,000		75,000	75,000	75,000	75,000
Total Annual Depreciation				1,000,000	1,075,000	1,075,000	1,075,000
Total Capex				21,500,000	-	-	-

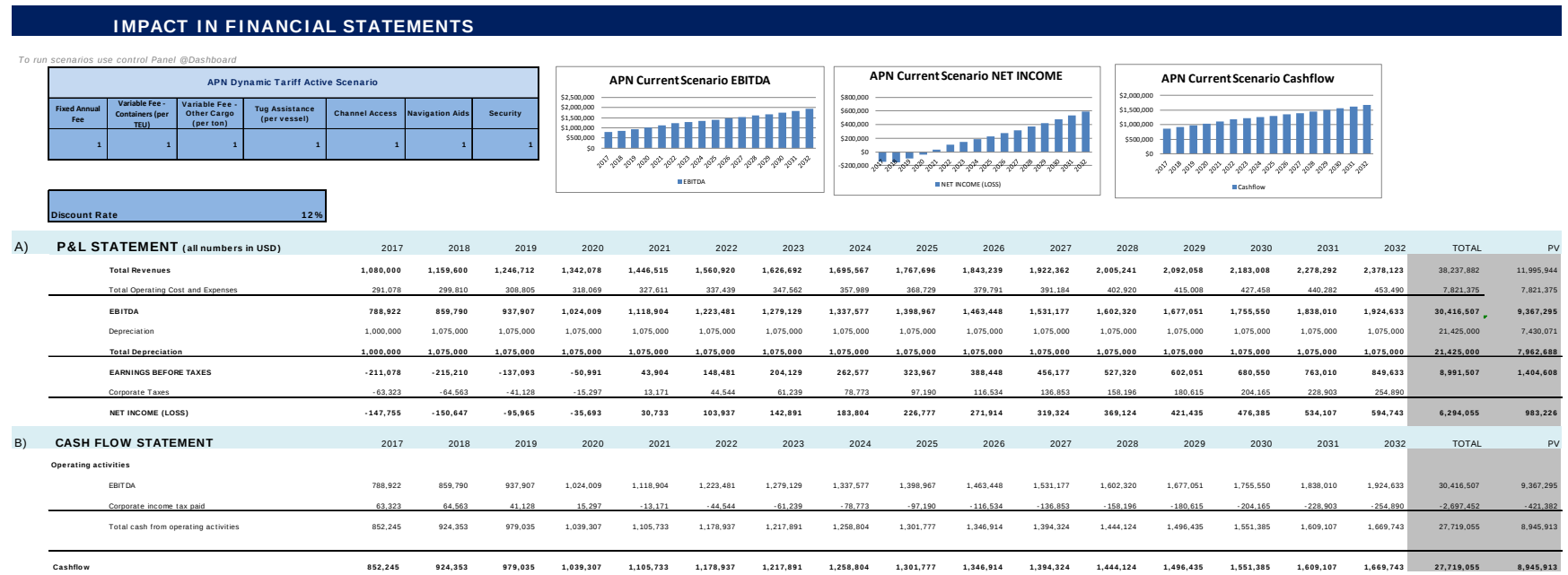
Source: Nathan Associates Inc., Tariff Analysis Model

Figure 18. Snapshot Financial Results from WSI – Inputs



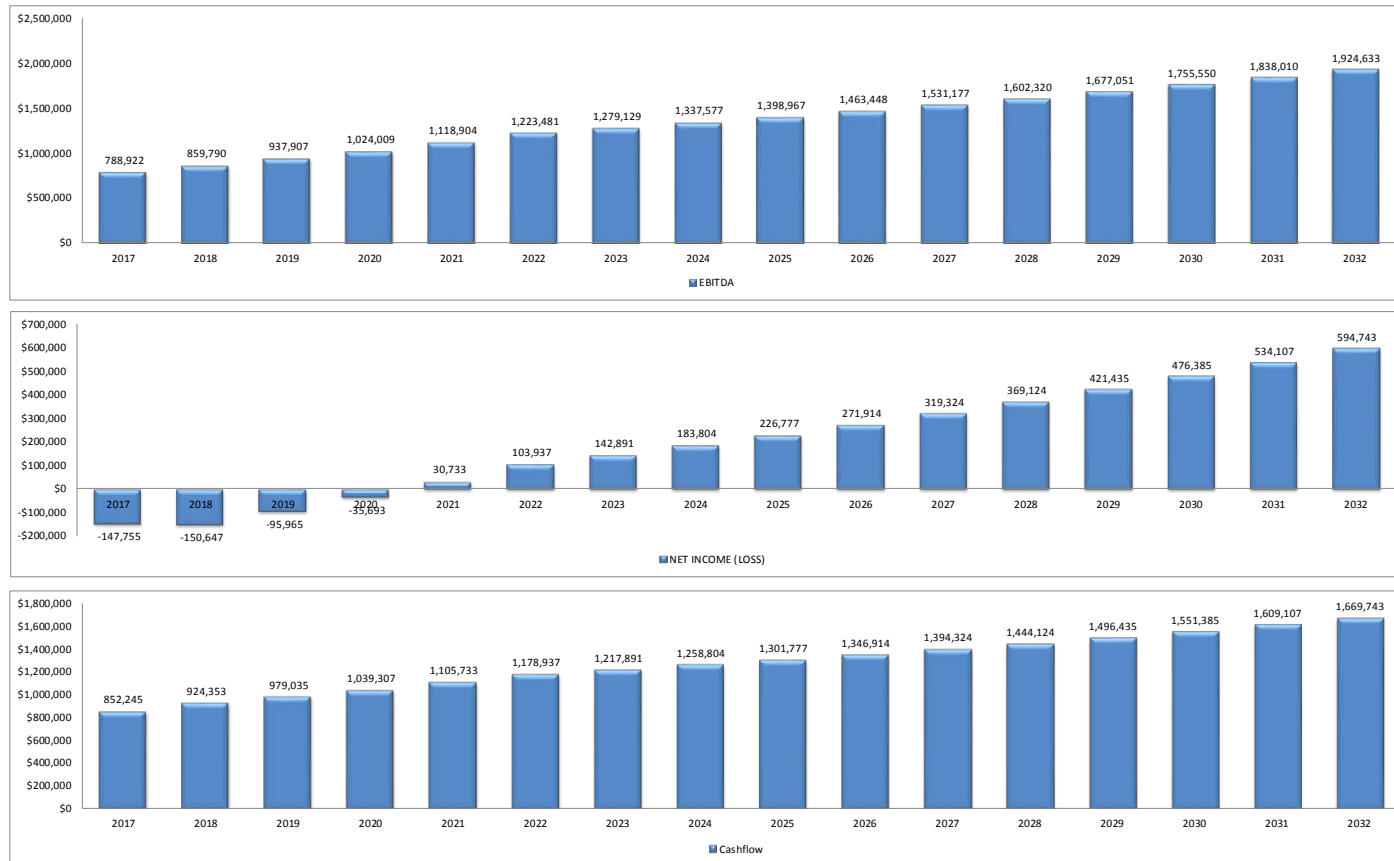
Source: Nathan Associates Inc., Tariff Analysis Model

Figure 19. Pro Forma Financial Statement



Source: Nathan Associates, Tariff Analysis Model

Figure 20. Graphical Depictions Pro Forma Financial Statement



Source: Nathan Associates, Tariff Analysis Model