Financing the Future: Financial Performance, Modernization and Funding Options for the Port Authority's Staten Island Bridges

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Abstract

- The Port Authority of New York and New Jersey operates both port facilities and regional bridges and tunnels. Recently, the need to replace and elevate key bridge structures has become critical due in part to the new mega container ships. The question of how to fund these improvements and changes to the New York Port is a pressing matter. Using a unique dataset constructed based upon historical financial reporting from the Port Authority of New York and New Jersey, the authors estimate the enterprise value that was created over an extended period of time for the Staten Island Toll Facilities to New Jersey. In particular, the project estimates a number of key metrics of success including capital costs, operation costs, facility profitability, payback period and capital burden as well as the total value created by the toll facilities. Options for financing are explored as are the key policy issues that must be addressed to utilize private capital in transportation infrastructure. The authors also consider the aspects of the financing of a modernization and elevation program for these facilities and their potential impact on maritime commerce. The authors found that the Port Authority's Staten Island Bridges were large financial liabilities early in their life, however, growth in traffic and toll rates have resulted in assets that have contributed a tremendous amount of capital to Port Authority regional projects in the form of producing economic rent above their operating and capital costs.

About the Authors

Dr. Jonathan Peters' Bio:

- Jonathan R. Peters is a professor of finance in the Business Department at The College of Staten Island of The City University of New York and a Member of the Doctoral Faculty in the Ph.D. Program in Earth and Environmental Science at the CUNY Graduate School. He is also a Research Fellow at The University Transportation Research Center at The City College of New York. He received his Ph.D. in Economics from the City University of New York and his Masters in Economics from Hunter College.

- Dr. Peters grew up on the waterfront in New York City in a family with strong ties to both the recreational and working waterfront. His family has been active in the New York City Maritime Community for over 130 years. Dr. Peters is the brother, son, grandson and great-grandson of ship captains who work/worked in or out of the Port of New York. He currently serves as the Vice Chair of the Board of Trustees for the Noble Maritime Collection on Staten Island.

- Dr. Peters previously worked in the Finance Division of AT&T Corporation where he was a subject matter expert on immigration and international finance. He serves on the Transportation Economics Committee of the National Academies of Science Transportation Research Board and the Board of the City University Institute for Urban Systems.

About the Authors

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- William E. Macaulay Honors College at CUNY Graduate -- triple majored in Finance, Economics, and Accounting
- Public Finance Research Assistant for Dr. Peters at the CUNY High Performance Computing Center, which is funded in part by the Research Foundation of CUNY – focused on Infrastructure Finance and Public Policy Research
- Former Asset Management Summer Associate at the NYC Pension Fund – the largest municipal pension fund in the world -- reported directly to the Chief Investment Officer, Larry Schloss
- Worked at two broker-dealers in New York City and attained the FINRA Series 7 and 63 Securities Licenses at age 19
- Recently accepted a position as a Global Infrastructure and Project Finance Associate Analyst with Moody's Investors Service in New York

The Port Authority of New York and New Jersey

- The Port Authority of New York and New Jersey, or PANYNJ, is a bi-state agency which was founded in 1921 through an interstate compact.
- The agency runs most of the bi-state regional transportation infrastructure in the New York City Metropolitan Area.

Port Authority of New York and New Jersey Introduction

- In addition to operating ports, rail lines, and airports; the Port Authority operates six bridges and tunnels within the Greater New York City area.
- The toll road facilities managed by the Port Authority include the Lincoln Tunnel, the Holland Tunnel, the George Washington Bridge, the Goethals Bridge, the Outerbridge Crossing, and the Bayonne Bridge, all of which connect New York and New Jersey.

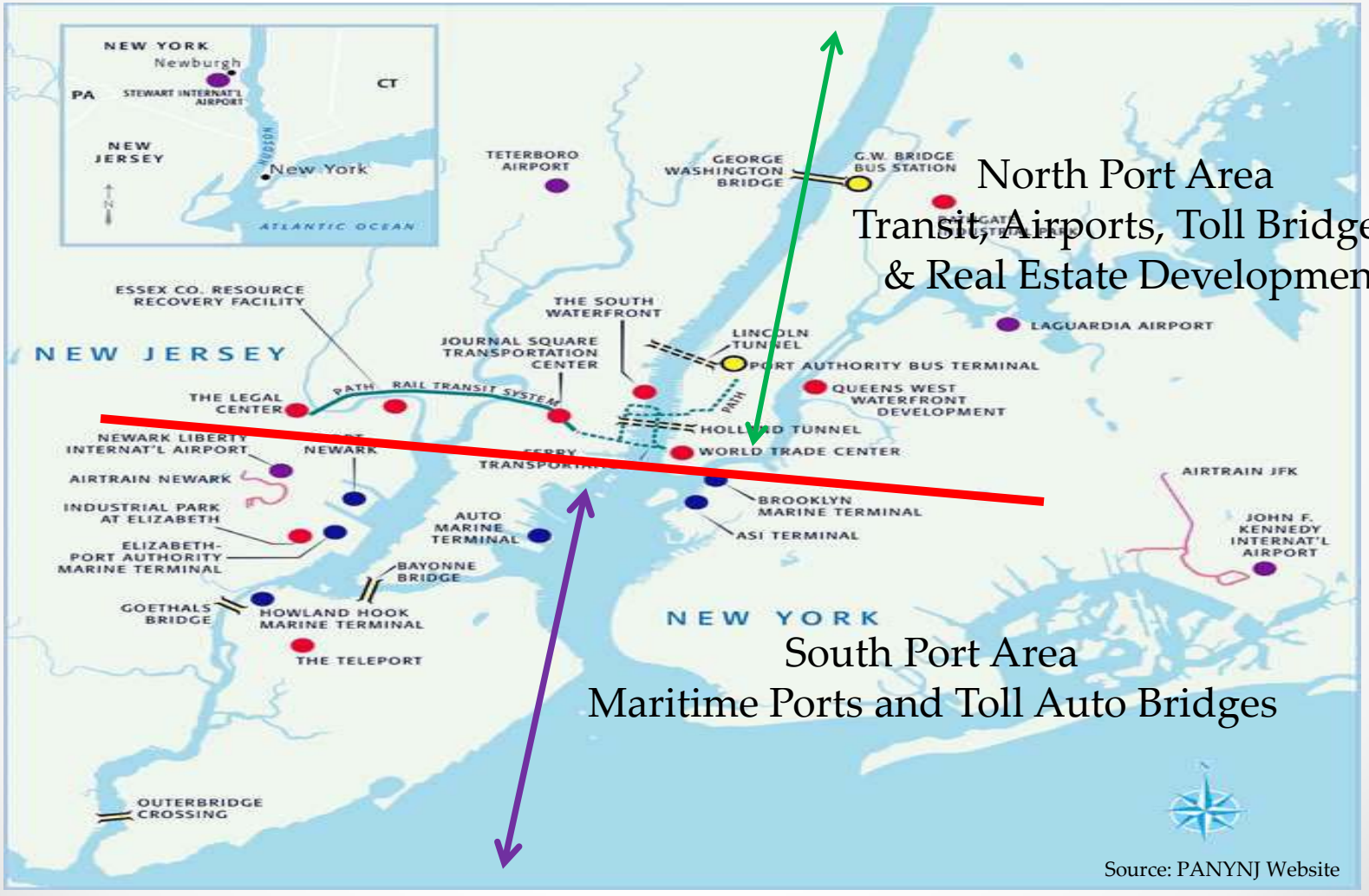
The Port Authority of New York and New Jersey

An Introduction

Source: PANYNJ Website

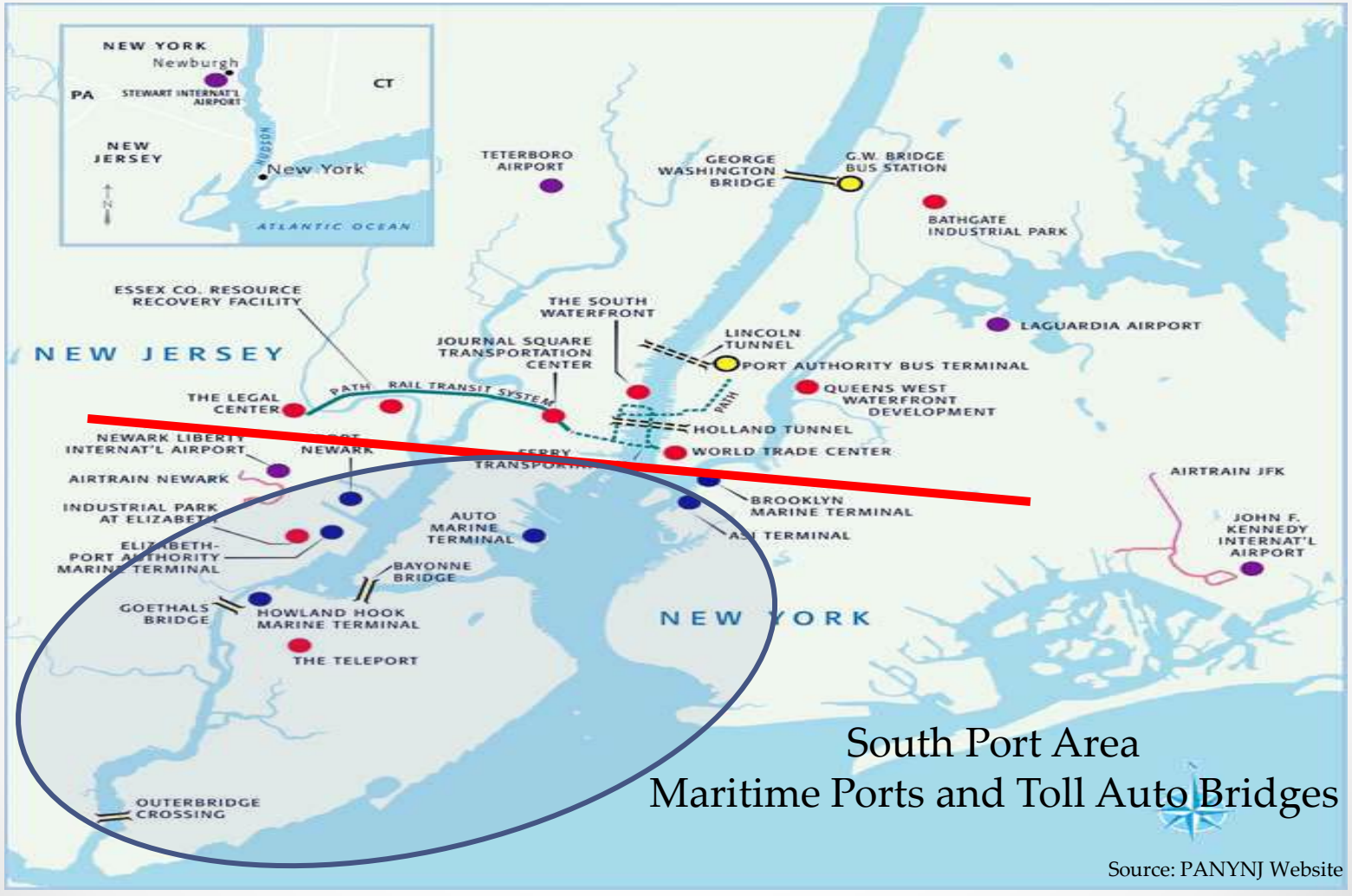
There is a split in activity areas

North and South Port Areas



Source: PANYNJ Website

Redevelopment of the South Port Area is key to the Future of Maritime in NY Metro



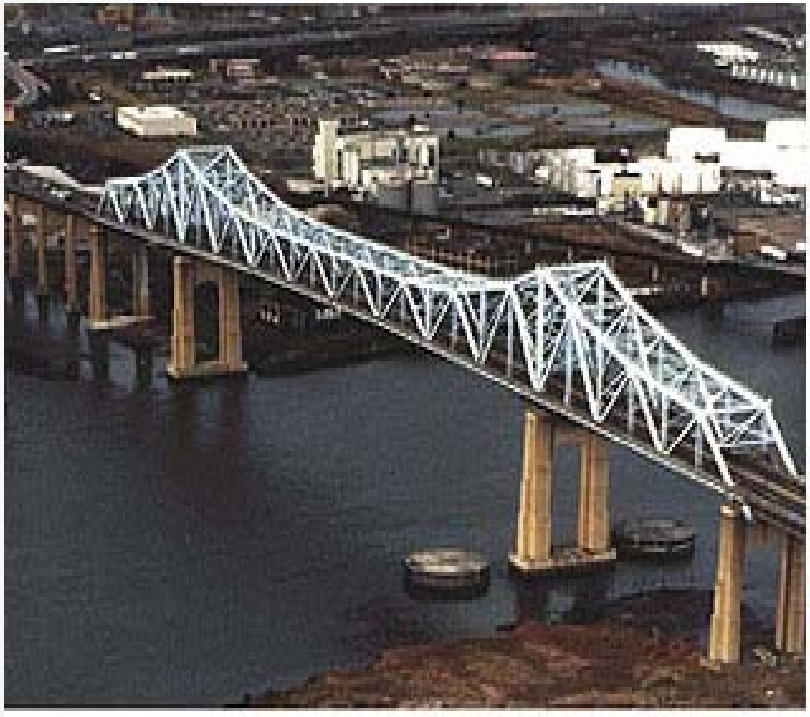
Source: PANYNJ Website

Why Modernization?

- Goethals Bridge – Must be replaced because the bridge is functionally and structurally obsolete – Scheduled for 2017 replacement.
- Bayonne Bridge – Superstructure's road deck must be raised to accommodate the air draft restrictions for Post-Panamax cargo ships – Scheduled for 2019 for deck replacement and elevation.
- Outerbridge Crossing – Identified as structurally and functionally obsolete in 1987. No schedule for this bridge replacement.
- Currently all Staten Island Bridge facilities are profitable or cover the majority of their costs.
- As toll facilities, they generally do not receive Federal or State highway funding.

Modernization

Goethals Bridge



Existing

Proposed

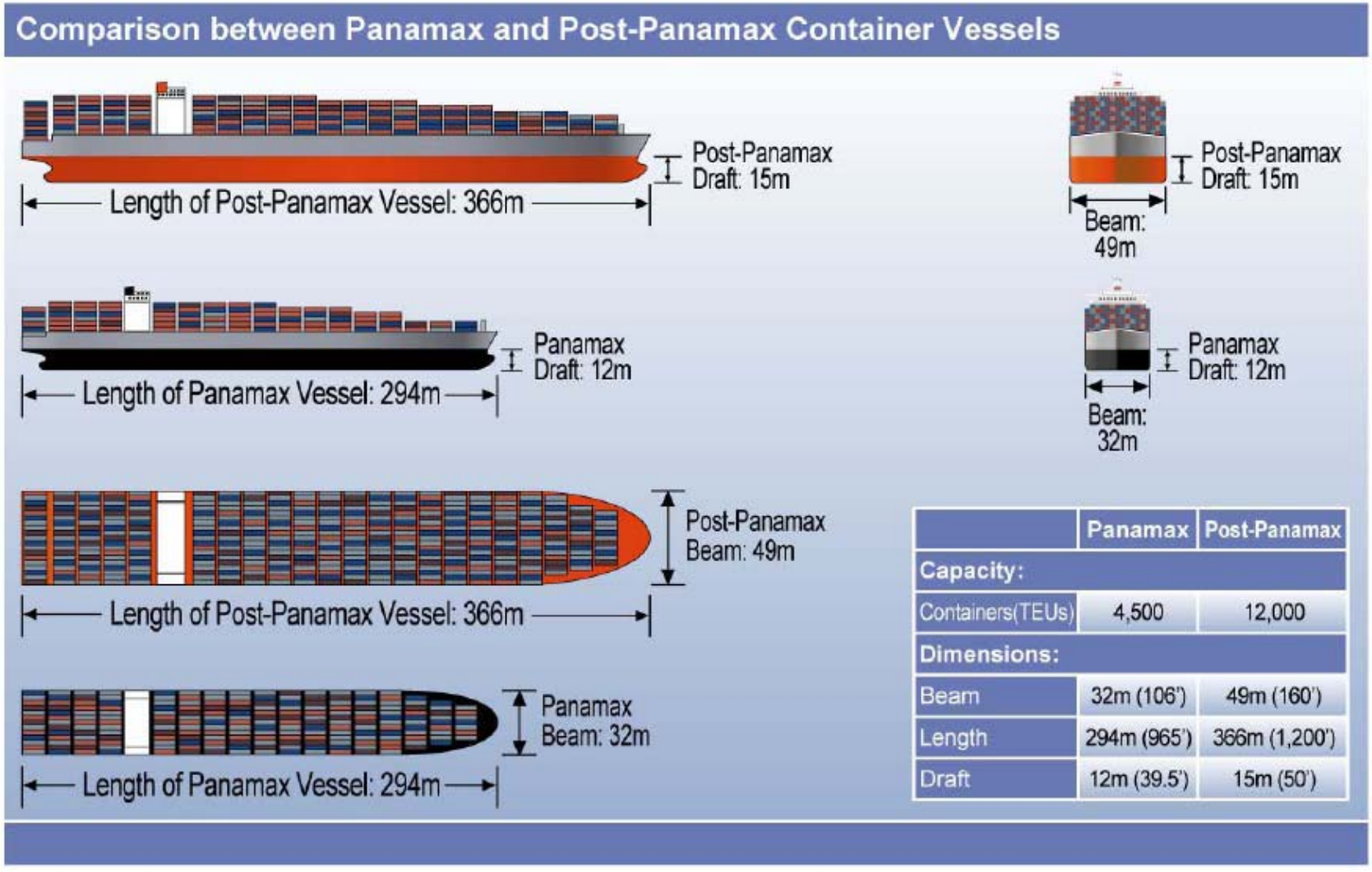
Source: PANYNJ Website

Modernization

Bayonne Bridge

Source: PANYNJ Website

Modernization



	Panamax	Post-Panamax
Capacity:		
Containers(TEUs)	4,500	12,000
Dimensions:		
Beam	32m (106')	49m (160')
Length	294m (965')	366m (1,200')
Draft	12m (39.5')	15m (50')

Source: US Army Corps of Engineers - Bayonne Bridge Air Draft Analysis

Emma Maersk – 14,777 TEU (Launched 2006)

Vessel type:	**Container Ship**
Gross tonnage:	170,794 tons
Summer DWT:	156,907 tons
Length:	398 m
Beam:	56 m
Draught:	11.5 m


MAERSK LINE
ESTELLE MAERSK

Bridge-related height restrictions are not limited to the Port of New York and New Jersey

Port Facilities with Significant Height Obstructions to Large Ships - Globally

Port Location	Obstruction	Height of Restriction
Hong Kong	Stonecutters Bridge	241 ft.
Suez Canal, Egypt	Mubarak Peace Bridge	230 ft.
New York & New Jersey	Verrazano Narrows Bridge	219 ft.
San Francisco/Oakland	Golden Gate Bridge	225 ft.
Oakland	Oakland Bay Bridge	220 ft.
Panama Canal	Bridge of the Americas	201 ft.
Los Angeles	Vincent Thomas Bridge	185 ft.
Yokohama	Yokohama Bay Bridge	184 ft.
Savannah	Talmadge Bridge	185 ft.
Hamburg	Kolnsbrucke	174 ft.
Long Beach	Gerald Desmond Bridge	156 ft (to 200 ft.)
New York & New Jersey	Bayonne Bridge	151 ft.

Source: Bayonne Bridge Air Draft Analysis - US Army Corps of Engineers

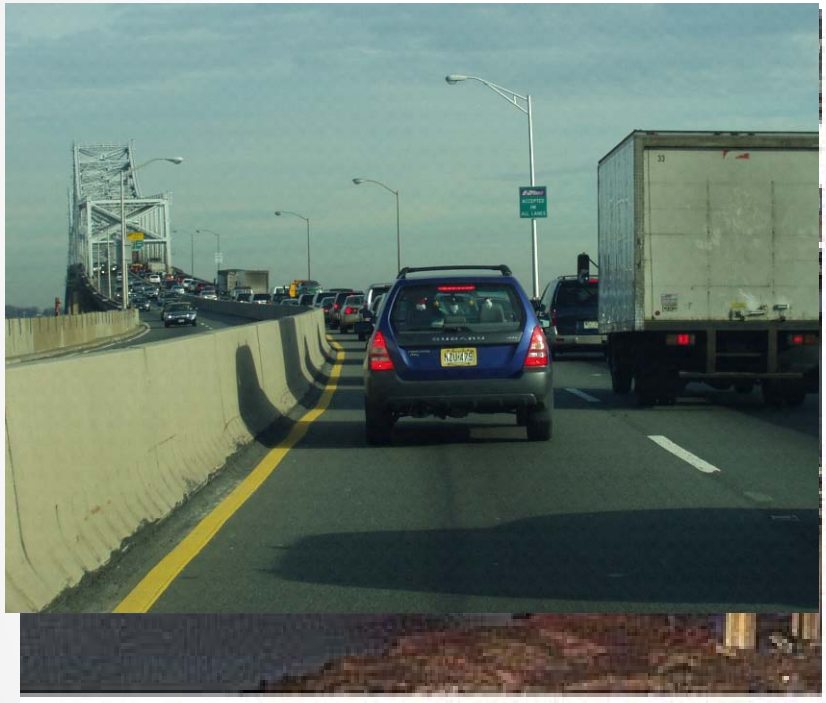
Several U.S. East Coast ports might need to take similar action as the PANYNJ over the next few decades regarding bridges that provide height restrictions to Post-Panamax ships

Port Facilities with Significant Height Obstructions to Large Ships - US East Coast

Port Location	Obstruction	Height of Restriction
New York & New Jersey	Verrazano Narrows Bridge	219 ft.
Charleston	Arthur Ravenel Bridge	186 ft.
Baltimore	William Preston Lane, Jr. Memorial Bridge	186 ft.
Baltimore	Francis Scott Key Bridge	185 ft.
Savannah	Talmadge Bridge	185 ft.
Houston	Fred Hartman Bridge	178 ft.
Tampa	Sunshine Skyway	175 ft.
Philadelphia	Walt Whitman Bridge	175 ft.
Wilmington & Philadelphia	Delaware Memorial Bridge	174 ft.
New Orleans	Crescent City Connection	170 ft.
New York & New Jersey	Bayonne Bridge	151 ft.
Philadelphia	Ben Franklin Bridge	135 ft.
Norfolk	N/A	N/A
Jacksonville	N/A	N/A
Miami	N/A	N/A
Mobile	N/A	N/A
Boston	N/A	N/A

Modernization

Outerbridge Crossing



Existing

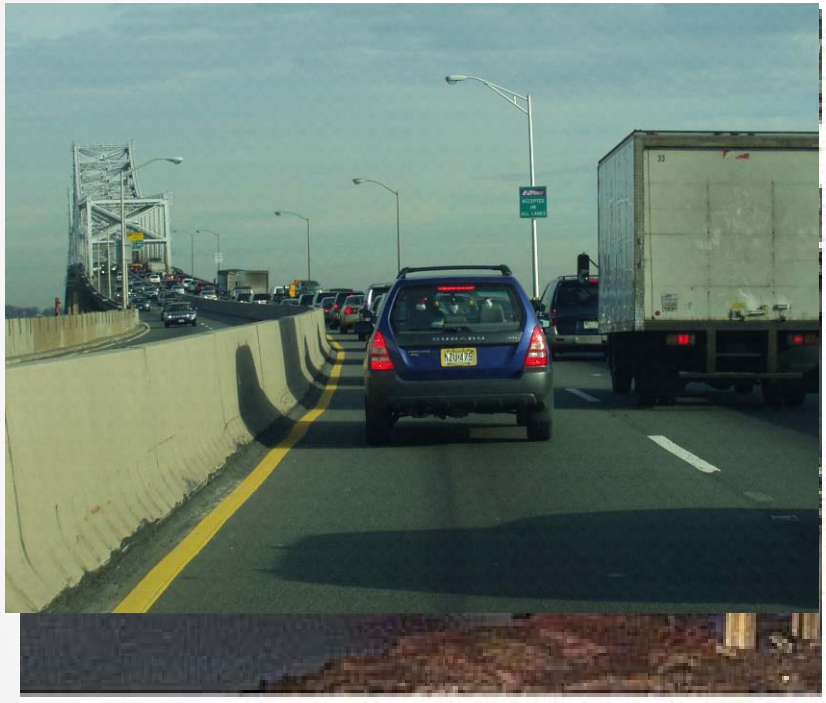
Proposed ???

Source: Authors

Actually – No Proposed Replacement Yet – Built 1928 – Identified as Obsolete in 1987!

Modernization

Outerbridge Crossing



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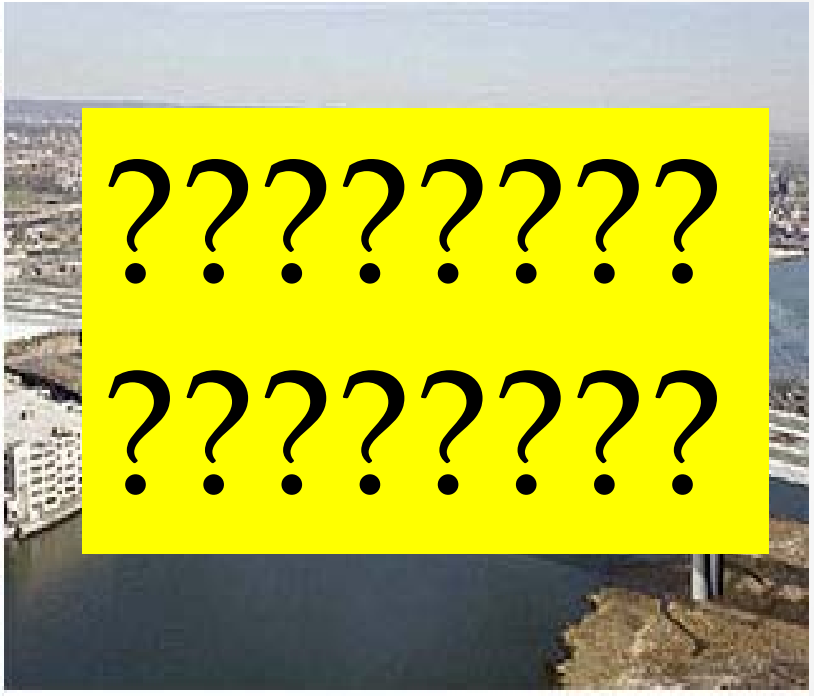

Proposed ???

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So, Just Who Should Pay?

- We need to do these projects for NY Metro to remain competitive and also to have world class infrastructure.
- We examine here the question as to what is the mechanism for funding improved port and bridge infrastructure.
- We also wish to explore the question of what base of users should pay for this infrastructure.

Funding Options

Bridge User vs. Shipping User -- Who Should Pay Costs of Raising Bridge Decks to Accommodate Post-Panamax Ships?

What are potential funding sources to pay for modernization of Goethals Bridge and the Outerbridge Crossing?

Obvious source for Modernization – Toll Revenue and Bonding for capital costs

Pay out of existing and prior toll revenue?

Raise tolls for additional funding?

PPP?

Current Financials (2010)

Facility	Revenue	Expenses	Profit
Bayonne Bridge	$ 28,347,000	$ 35,187,000	$ (6,840,000)
Goethals Bridge	$ 123,257,000	$ 41,430,000	$ 81,827,000
Outerbridge Crossing	$ 109,176,000	$ 40,355,000	$ 68,821,000
Total SI Bridges	$ 260,780,000	$ 116,972,000	$ 143,808,000
Percentage of Revenue		44.9%	55.1%

Revenue and Volume in 2010

Staten Island Bridges	2010 Crossings	2010 Vehicular Percentage Breakdown
Automobiles	30,034,000	91.78%
Buses	204,000	0.62%
Trucks	2,486,000	7.60%
Total vehicles	32,724,000	100.00%
Total revenue	$260,780,000	Approximately $8.00/trip

Costs for Modernization

- Bayonne Bridge – Raise Deck and retain existing arch – 1.0 Billion Dollars

- Goethals Bridge – Complete rebuilding of a 1928 Structure with 4 - 10 foot wide travel lanes to a 6 lane facility with 12 foot travel lanes – over $1.0 Billion Dollars

- Outerbridge Crossing – Assume – a complete rebuilding of a 1928 Structure with 4 - 10 foot wide travel lanes to a 6 lane facility with 12 foot travel lanes – Not scheduled or priced at this point. Assume $1.0 Billion Dollars in costs.

- Overall – a depreciated capital stock that is fully in need of replacement or broad structural renovation.

Toll Burden in New York Metro

- Raising tolls is politically charged – very heavy toll burden in NY Metro Region – Over $2,000,000,000 charged annually.
- Who should pay? Shipping Firms? Federal Funds? Toll Bridge Users?
- Recent Questions regarding diversion of toll revenue to World Trade Center Site – Navigant Report.
- For Example - if Staten Island were a state, it would rank in the top ten states in terms of toll collection per state -- Almost 5% of National Tolls in 2008.
- Have these users already paid?

Staten Island Toll Burden Relative to Top 25 Toll Collecting States (as of 2008)

2008					
Toll Rank	**State**	**State Total** (Net SI)	**Cumulative Tolls**		**% of Nations Tolls**
1	New York	$ 2,471,894	$ 10,984,608		21.46%
2	Florida	$ 1,137,673	$ 8,512,714		9.88%
3	New Jersey	$ 853,161	$ 7,375,041		7.76%
4	Illinois	$ 894,339	$ 6,521,880		7.59%
5	Pennsylvania	$ 873,941	$ 5,627,541		7.42%
6	Texas	$ 854,707	$ 4,753,600		7.41%
7	California	$ 842,077	$ 3,898,893		7.31%
8	Staten Island	$ 534,838	$ 3,056,816		4.64%
9	Massachusetts	$ 532,658	$ 2,521,978		4.62%
10	Maryland	$ 273,087	$ 1,989,320		2.37%
11	Delaware	$ 248,548	$ 1,716,233		2.16%
12	Oklahoma	$ 198,207	$ 1,467,685		1.72%
13	Ohio	$ 190,736	$ 1,269,478		1.66%
14	Virginia	$ 163,455	$ 1,078,742		1.42%
15	Washington	$ 157,320	$ 915,287		1.37%
16	Indiana	$ 149,246	$ 757,967		1.30%
17	Maine	$ 109,083	$ 608,721		0.95%
18	New Hampshire	$ 103,029	$ 499,638		0.89%
19	Colorado	$ 98,082	$ 396,609		0.85%
20	Kansas	$ 78,515	$ 298,527		0.68%
21	West Virginia	$ 57,750	$ 220,012		0.50%
22	Louisiana	$ 39,808	$ 162,262		0.35%
23	Michigan	$ 36,347	$ 122,454		0.32%
24	Georgia	$ 28,321	$ 86,107		0.25%
25	Alaska	$ 23,590	$ 57,786		0.20%

Source: FHWA

Long Term Financial Analysis

- To examine these questions, the authors went back to historical records from the Port Authority of New York and New Jersey (Annual Reports)
- We used additional historical sources to evaluate the financial history of the Staten Island Bridges
- Bridges were grouped into a common facility (Staten Island Bridges) across all periods for analysis purposes based upon historical reporting (pre 1975 data).
- Facilities were examined for revenue, costs & profit.
- Capital losses were capitalized and carried forward.

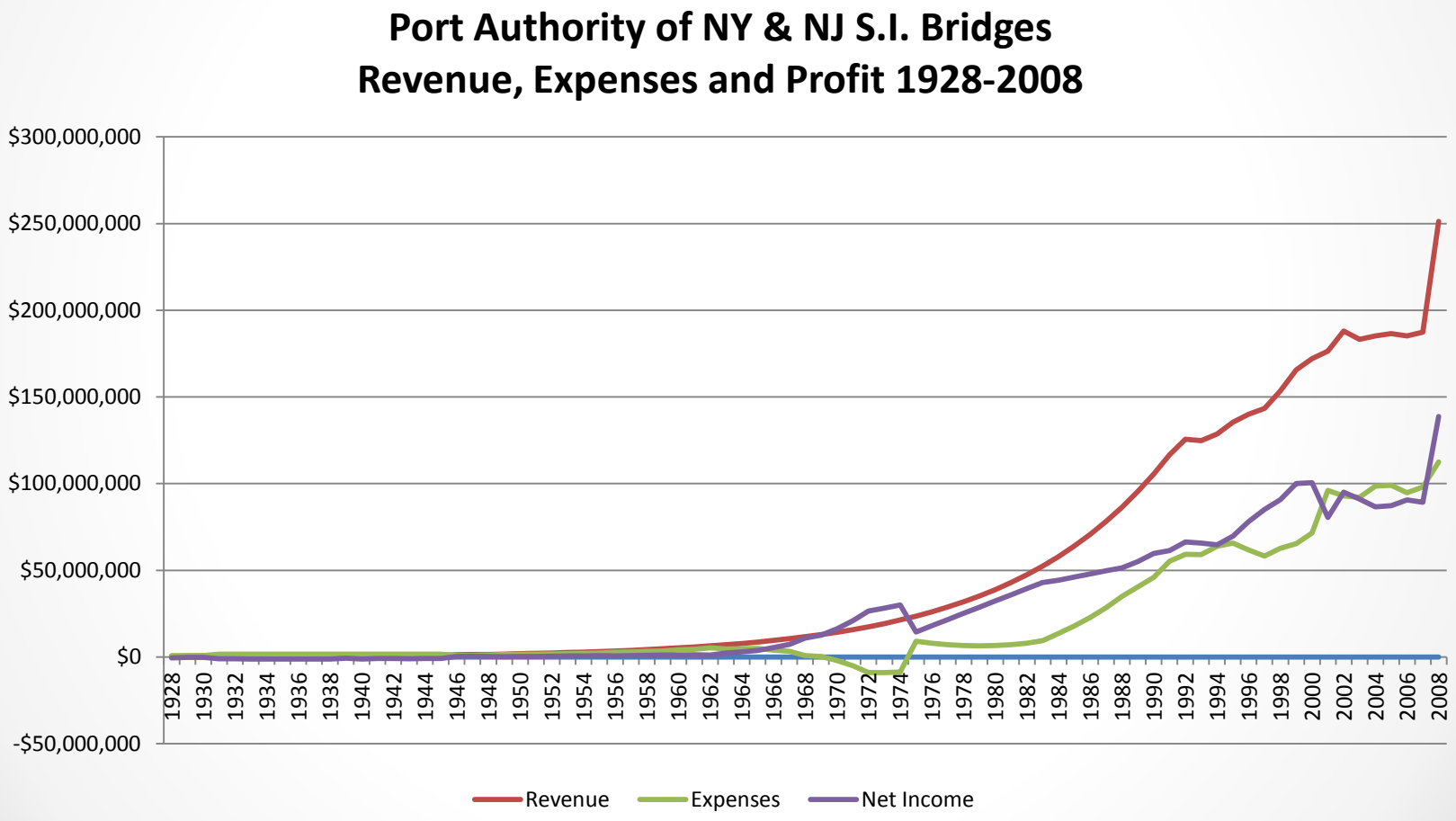
Financial Performance

- The authors transcribed the financial statement data they found from a number of sources for each PANYNJ Staten Island bridge.
- They quantified the financial statement data from the unique data sets from each of the three bridges to build one integrated financial model for all three bridges.
- This financial model derived the totals for several key financial performance metrics for the three bridges per year.

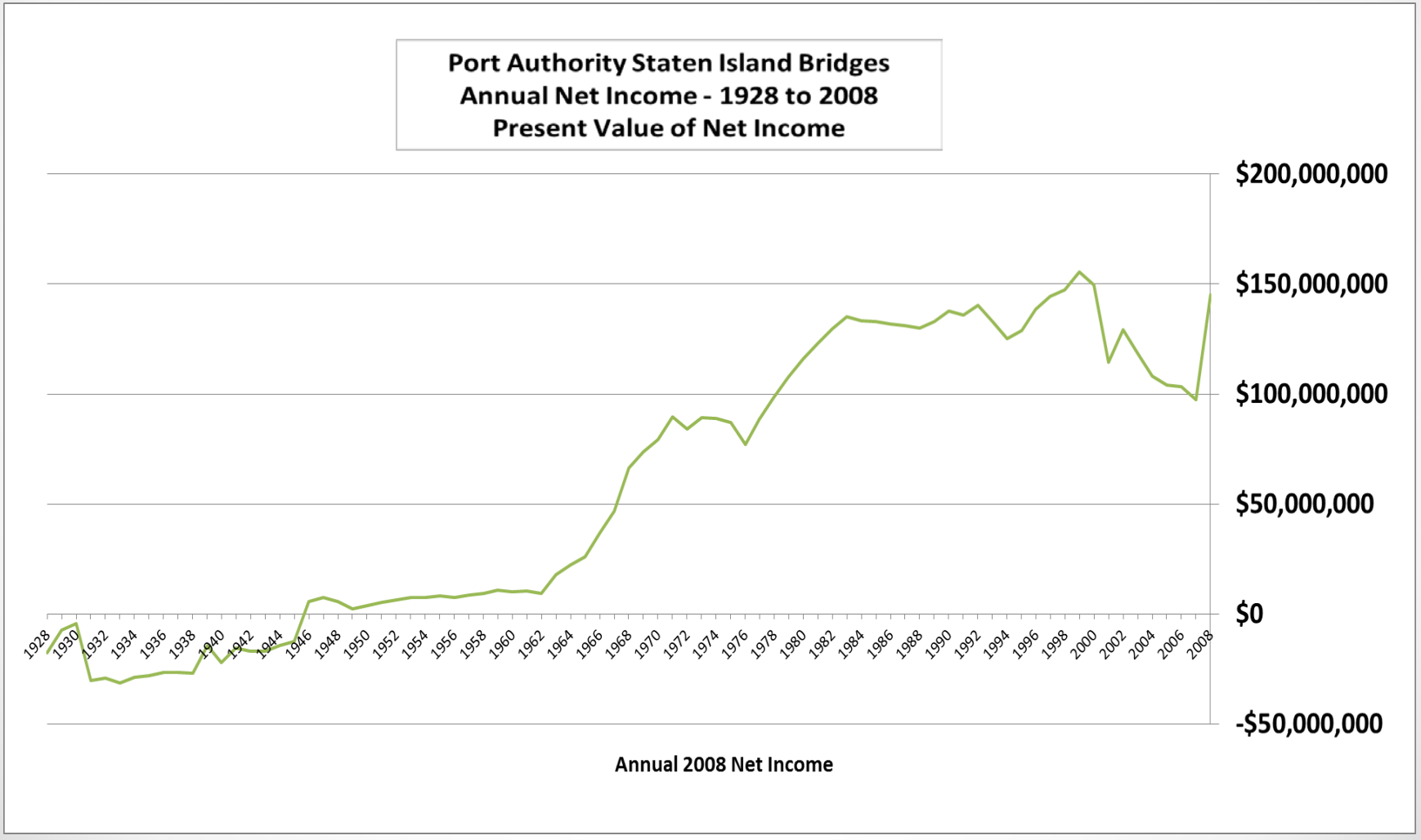
SI Bridges – Financial History Based on Financial Model

- Facilities built in 1928 (Goethals & Outerbridge) and 1931 (Bayonne)
- Facilities had low volume from 1928 to 1945
- Facilities lost money from 1928 to 1945
- Losses were capitalized by the authors to examine the overall financial impact on Port Authority of New York and New Jersey Financials.
- Losses took until 1968 to be repaid.
- Revenue performance improved based upon increased volume and toll increases.

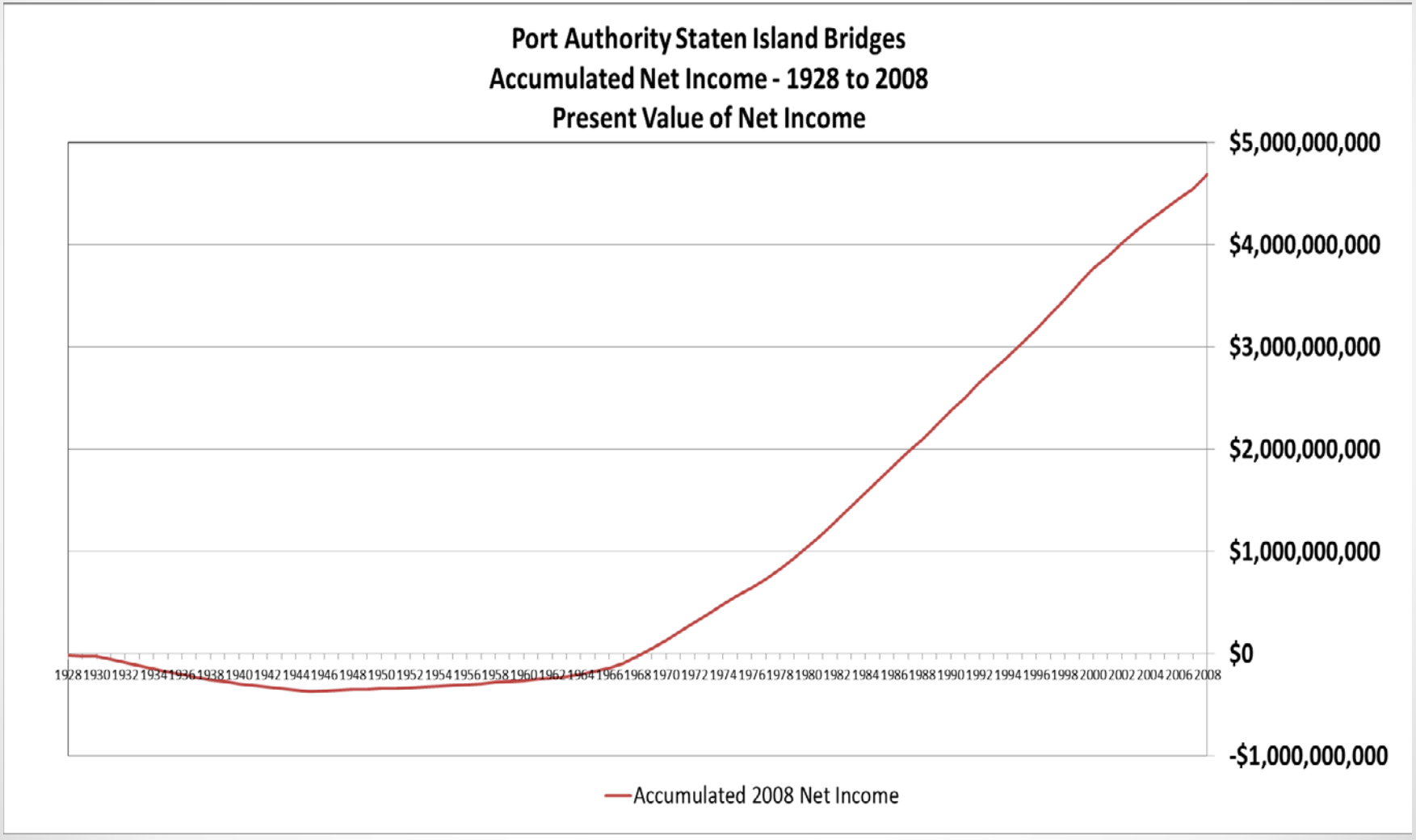
Revenue, Expenses & Profit



Financial Performance



Financial Performance



Enhanced Revenue Performance

- Example – Outerbridge Crossing
- Carried 6,000 Vehicles Per Day – 1960 (Eastbound)
- Carried 89,928 Vehicles Per Day – 2010 (Eastbound)

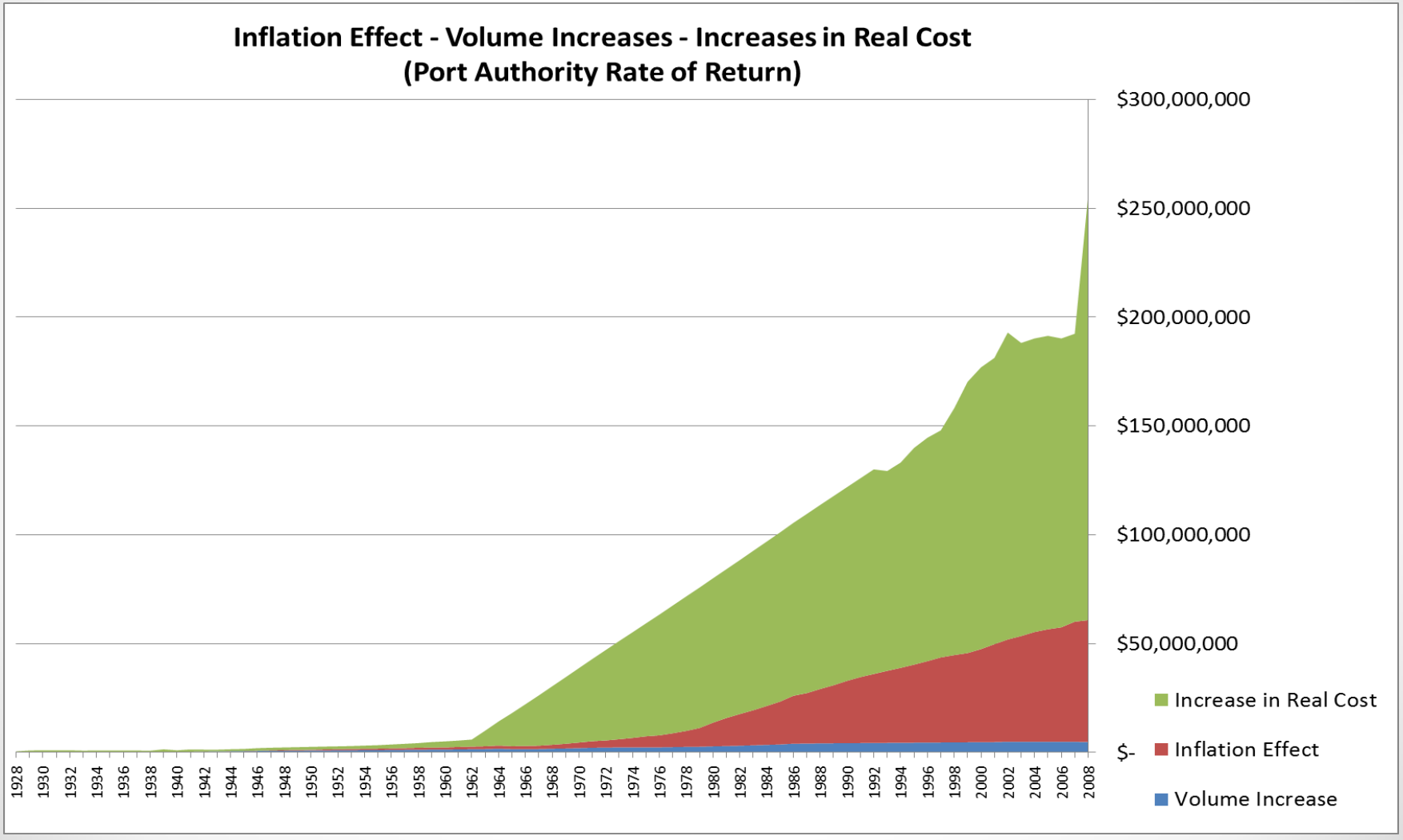
- Price Per Vehicle 1960 = $.30
- Price Per Vehicle 2010 = $7.97

- Profit = Revenue – Costs
- Profit = (Price*Quantity) - Costs
- So -- in this case -- both Volume and Price Increased

Relative Price Change vs. CPI

	CPI-U	PA SI Bridge Tolls
Dec-60	29.80	$ 0.30
Dec-10	219.20	$ 7.97
Change	736%	2657%
Relative Change VS CPI		361%

Financial Performance



Financial History of the Staten Island Bridges

- SI Bridge Facilities were a net financial drain from 1928 to 1945 on the Port Authority of New York and New Jersey – cross subsidized from other operations.
- Facilities became income positive in 1945 and paid back losses by 1968.
- Toll increase and volume increases have yielded over 4.5 Billion Dollars in net revenue to the Port Authority of New York and New Jersey since 1968.
- Those funds should be available for modernization and improvements – but were they spent on other operations and capital projects?

Funding Options - I

Solving a funding problem for transportation infrastructure involves numerous potential options.

For the Port of New York and New Jersey – clearly modernization is needed.

Modernization could occur in terms of the location of the maritime trade facilities – or we could retrofit our port facilities for the ship of tomorrow(See Peters, Davidson, Flanagan and Gordon on this idea).

Modernizing the Staten Island Bridges appears to be a critical component of these improvements.

These facilities are essentially financially self renewing on a stand alone basis – however, diversion of resources appears to be slowing the progress of modernization.

Similar discussions as the Tappan Zee Bridge replacement.

Funding Options - II

1. Traditional Funding Mechanism – Municipal Bond Issuance

2. Public-Private Partnership

A. Long-Term Lease (Demand Risk) Model – Examples include the Chicago Skyway, Indiana Toll Road, and more recently, the PR-5 and PR-22 toll roads

B. Availability Payment Model - Examples include the Port of Miami Tunnel and the reconstruction of I-595 in the Fort Lauderdale area

Do We Really have a Problem?

- Revenue is Greater than Expenses.
- Current Facilities cover their full load costs – including allocated costs for general overhead from the Port Authority.
- Existing Toll Revenue appears to be adequate to fund a full replacement program for these facilities.
- Yet – Plans are lacking and alternative financing tools are being used. In addition, some plans are relying on federal funding.

Funding Options

Our Proposals:

Funding Option Proposal for Bayonne Bridge:

Create a special purpose project finance vehicle for the Bayonne Bridge to finance the bridge raise through projected revenues from both shipping traffic and vehicular traffic.

OR

Bundle Staten Island Bridges into a separate S.I. Bridge Authority – and let them self renew – could self fund from existing toll revenue all replacements and repay within 30 years if future financial performance continues at the same rate of return as historical financial performance up until this point.

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Questions?

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