Generating Environmental Currency: Turning Eco-Projects Into New Lines of Business

AAPA Capital Projects Seminar

Norfolk, VA
May 9, 2018
Seminar agenda

Introduction & subject overview

Introduction of panel

Generating environmental currency – Port of Long Beach perspective & experience

Generating environmental currency – Port of Cleveland perspective & experience

Panel interview, questions, answers and participation

Takeaways
Introduction & subject overview

- The ‘business’ of port authorities has to become more profit orientated and financially self-reliant and funding
- All costs need to be addressed from a ‘profit centre’ standpoint
- Environmental stewardship is no exception

Quote from Aaron Ellis, 2 May 2018

Too many lemons & Not enough Lemonade!!
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- Takeaways
Matthew Arms, Assistant Director of Environmental Planning for the Port of Long Beach, California, joining the Port in 2003.

Mr. Arms earned his Bachelor of Science degree in Environmental Science from Washington State University in 1998 and worked in environmental consulting before beginning his career at the Port.

Environmental Planning is the division most directly responsible for the Port’s industry-leading environmental programs eg, the 2005 Green Port Policy and the 2006 San Pedro Bay Ports Clean Air Action Plan (CAAP) and its 2017 Update.

The division leads programs to improve air, water and soil quality, preserve wildlife habitat and integrate sustainability into Port practices.

Due to the effectiveness of these programs, total diesel emissions at the Port have dramatically dropped by 85% since 2005, and native wildlife is making a comeback.
Nicholas LaPointe

Director
Planning & Capital Development

Cleveland-Cuyahoga County Port Authority

Nick is a Professional Engineer, overseeing the port’s capital infrastructure planning and maintenance, asset management and project delivery.

Nick also manages the port’s Sediment Processing and Management Facility - critical to the maritime community in Cleveland, as it is responsible for annually processing and beneficially harvesting more than 250,000+ CY of dredged sediment from the Cuyahoga River and Cleveland Harbor.

Professionally, Nick has always been in the maritime and ports industries. Prior to joining the port, he spent nine years working on complex marine infrastructure projects along the East Coast with Weeks Marine Inc - one of the nation’s largest marine contractors.

Before that, he obtained a bachelor’s degree in Civil Engineering from the University of Toledo and an MBA from Case Western Reserve University while working as a captain on Lake Erie.
Established in 2003, Aegir is the pioneer property consultancy exclusively focused on meeting the unique real estate challenges faced by ports and associated maritime and logistics industries by increasing competitive advantages, maximising property revenues and enhancing overall port values through the more strategic use of a port’s largest asset – property.

Pigna has been meeting complex property related challenges worldwide on behalf of clients in the port, shipping, related logistics, financial, infrastructure, corporate and institutional investment sectors for decades. He is a member of The Counselors of Real Estate and is a Fellow and Chartered Management Consultant of the Royal Institution of Chartered Surveyors.

Pigna is a frequent speaker internationally at industry events and universities and has authored several papers, articles and chapters in books on port property, infrastructure finance and port authority and city-port issues.
Let’s get started…

TIME TO **THINK WELL OUTSIDE THE ZONE**…

…**BOX** NOT REQUIRED!
Business challenges ports face – addressing their environmental stewardship duties

• Globalisation will continue; global commerce gateways ie, ports, will continue to expand with increased cargo velocity and throughput

• Historically, ports were major centres of pollution – air, water, light and noise; this is no longer sustainable or allowable by port communities

• Ports are a nexus for trade, industrial activity and energy- how this is managed needs and is being re-thought

• Chasing ‘economies of scale’ by shipping lines and shippers is presenting numerous challenges to ports, including in the environmental front

• Major advances have been made on the environmental front; still a way to get near carbon neutral

• Financial sustainability of environmental initiatives needs to be addressed
Container shipping - Findings from Drewry study
Diminishing economies of scale from megaships?

Simulation shows liner costs fall as ships get bigger

- As vessel sizes increase: Shipping lines’ network costs fall...but the costs incurred by ports and terminals rise...o overall system costs increase

- Drewry believes optimum vessel size reached for foreseeable future (and may already been exceeded)

- Aegir believes ports not charging enough to cover true costs and profit on asset values and operating costs

<table>
<thead>
<tr>
<th>Base Case</th>
<th>Scenario 1</th>
<th>Scenario 2</th>
<th>Scenario 3</th>
<th>Scenario 4</th>
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</thead>
<tbody>
<tr>
<td>Charter Costs</td>
<td>$0</td>
<td>$800</td>
<td>$1,200</td>
<td>$1,600</td>
</tr>
<tr>
<td>Bunker Costs</td>
<td>$400</td>
<td>$800</td>
<td>$1,200</td>
<td>$1,600</td>
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</tbody>
</table>

However, also shows port costs rising with vessel size

<table>
<thead>
<tr>
<th>Base Case</th>
<th>Scenario 1</th>
<th>Scenario 2</th>
<th>Scenario 3</th>
<th>Scenario 4</th>
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<tr>
<td>Terminal and Port OPEX</td>
<td>$0</td>
<td>$800</td>
<td>$1,200</td>
<td>$1,600</td>
</tr>
<tr>
<td>Cost of ownership</td>
<td>$1,200</td>
<td>$1,600</td>
<td>$1,600</td>
<td>$1,600</td>
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</table>
Larger ships, major peak periods changing demand for ports/terminals…

…requiring more infrastructure, longer periods of underutilisation, lower revenues AND fewer, but larger terminals – MAJOR port challenge!

Before

3,000 boxes
MONDAY

3,000 boxes
THURSDAY

Shipping lines obtaining cost savings with bigger ships…

Are shipping lines prepared to pay for these enhanced requirements?

After

6,000 boxes
MONDAY

...but generating higher investment needs through supply chain infrastructure
Implications of liner industry development
Terminal costs now the largest spend item for carriers

% split of costs (AP Moller Maersk)
2012 and 2015

<table>
<thead>
<tr>
<th>Costs</th>
<th>2012</th>
<th>2015</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vessel</td>
<td>26%</td>
<td>28%</td>
</tr>
<tr>
<td>Bunker</td>
<td>25%</td>
<td>13%</td>
</tr>
<tr>
<td>Terminal</td>
<td>24%</td>
<td>32%</td>
</tr>
<tr>
<td>Other</td>
<td>25%</td>
<td>27%</td>
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</table>

Pressure to reduce terminal handling costs (impact on port fees?)

Question of joint contracting by alliances (impact on port concession, rents?)
Areas of opportunities…

• Holistic approach to pricing port services, property assets, fixed and variable revenues to cover true costs of operating a port – private sector would/cannot subsidise clients, why should ports?

• Ports are natural geographic concentrations and central hubs for logistics, value added services, commerce, finance, raw materials and increasingly – energy.

• Few ports have actively pursued energy management strategies – the need for this is now.*

• Why? This results form their need to co-ordinate their planning, acting as a transport nexus, managing and fomenting economic activity and growth AND, addressing the increasingly importance of environmental stewardship.*

• For future ports, active energy management offers efficiency gains, development of alternative revenue sources, heightened competitive advantages and higher returns on and of capital invested for their shareholders.*

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2. Introduction of panel
3. Generating environmental currency – Port of Long Beach perspective & experience
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5. Panel interview, questions, answers and participation
6. Takeaways
GENERATING ENVIRONMENTAL CURRENCY

MATT ARMS
ASSISTANT DIRECTOR,
ENVIRONMENTAL PLANNING
PORT OF LONG BEACH

LEADING GATEWAY FOR U.S.-ASIA TRADE
$180 BILLION IN CARGO
SUPPORTING 30,000 LONG BEACH JOBS
TERMINAL PROJECTS SINCE 1990

PIER A Opens 1997
PIER C Opens 1991
PIER T Opens 2002
PIER G Redevelopment Begins 2002
PIER J Expansion 1993
TERMINAL PROJECTS
SINCE 1990

PIER A Opens 1997

PIER T Opens 2002

PIER C Opens 1991

Middle Harbor Redevelopment Begins 2009

PIER J Expansion 1993

PIER G Redevelopment Begins 2002
Optimizing the Fill Plan

- Silts, clays and compressible soils lower in fill
- Separate larger layers of silts/clays with sand for drainage
- Provide a non-compressible area above existing rock slopes
- Surcharge and wick drains for settlement management
<table>
<thead>
<tr>
<th>Approximate Elevation (ft)</th>
<th>Fill Layer</th>
<th>Tentative Projects for Each Layer</th>
<th>Estimated Source Volume (cy)</th>
<th>Estimated Total Volume (cy)</th>
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</thead>
<tbody>
<tr>
<td>(+15 to +45)</td>
<td>7</td>
<td>Borrow Site</td>
<td>500,000</td>
<td>700,000</td>
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<tr>
<td></td>
<td></td>
<td>Storage Site</td>
<td>200,000</td>
<td></td>
</tr>
<tr>
<td>(+8 to +15)</td>
<td>6</td>
<td>Storage Site</td>
<td>300,000</td>
<td>300,000</td>
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<tr>
<td>(-5 to +8)</td>
<td>5</td>
<td>LA County, Marina del Rey, Areas 1-6</td>
<td>116,000</td>
<td>531,000</td>
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<tr>
<td></td>
<td></td>
<td>LA County, Marina del Rey, Areas 7-9</td>
<td>108,000</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Port of Los Angeles, China Shipping Surcharge</td>
<td>307,000</td>
<td></td>
</tr>
<tr>
<td>(-15 to -5)</td>
<td>4</td>
<td>Eagle Rock Aggregate, Port of Long Beach D44</td>
<td>6,000</td>
<td>300,000</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Miscellaneous Port of Long Beach Projects</td>
<td>100,000</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>City of Long Beach, Colorado Lagoon</td>
<td>70,000</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>City of Long Beach, Alamitos Bay</td>
<td>41,000</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>LA County, Marina del Rey, Areas 7-9</td>
<td>83,000</td>
<td></td>
</tr>
<tr>
<td>(-20 to -15) Granular Layer</td>
<td>3</td>
<td>LA County, Marina del Rey, Areas 1-6</td>
<td>164,000</td>
<td>164,000</td>
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<tr>
<td>(&lt;-20) Berm</td>
<td>2</td>
<td>LA County, Marina del Rey, Areas 7-9</td>
<td>100,000</td>
<td>100,000</td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>City of Newport Beach, Rhine Channel</td>
<td>150,000</td>
<td>325,000</td>
</tr>
<tr>
<td></td>
<td></td>
<td>USACE LARE and City of Long Beach Rainbow Harbor</td>
<td>175,000</td>
<td></td>
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</tbody>
</table>
1. Inner Harbor Turning Basin & Back Channel
2. Pier T/West Basin/Pier Echo
3. Middle Harbor Sediment Trap
4. Phase 3 East Basin Fill

5. Pier J South Access Channel
6. Pier F, Berths 206-207
7. Pier A, Berths 88-96
8. Pier B, Berths 84-87
9. Pier B, Berths 82-83
MITIGATION CREDITS

• Used to mitigate loss of marine habitat in the Port from fills

• Bolsa Chica Restoration

• Colorado Lagoon Restoration

• Los Cerritos Wetlands Restoration
SOLAR INSTALLATION
ZERO EMISSIONS EQUIPMENT
ON-DOCK RAIL
TURNING ECO PROJECTS INTO NEW BUSINESS
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CLEVELAND HARBOR

- 20,000+ Jobs
- $3.5B Economic Activity
- 13 Million Tons Annually
- 1st Major U.S. Port of Call St. Lawrence Seaway System
- 6+ Miles Protected Breakwater
- 5.9 Mile Federally Maintained Navigation Channel
PORT OF CLEVELAND: MARITIME BUSINESS

GENERAL CARGO

BULK CARGO

DREDGE SEDIMENT MANAGEMENT
ANNUAL DREDGING & CDF CAPACITY CONSTRAINTS

• 250,000+ CY MATERIAL DREDGED FROM RIVER & HARBOR ANNUALLY
• FEDERAL CHANNEL GEOMETRY DE-ENERGIZES RIVER
• HISTORICALLY MATERIAL DEPOSITED UPLAND IN SERIES OF CONFINED DISPOSAL FACILITIES (CDFs)
• LONG TERM CDF CAPACITY EXHAUSTED IN CLEVELAND HARBOR
• COSTS OF CONSTRUCTING NEW A NEW CDF HAVE BEEN ESTIMATED @ $175M+
CLEVELAND HARBOR CONFINED DISPOSAL FACILITIES
PORT OF CLEVELAND’S SEDIMENT PROCESSING FACILITY & BENEFICIAL REUSE MODEL

1. 2 sluiceways settle coarse material
2. Silts settle in secondary basin
3. Water clarifies in 3rd basin
4. Recycling basin for water for scows
5. Areas for (a) stockpiles and (b) compost
PORT OF CLEVELAND’S SEDIMENT PROCESSING FACILITY & BENEFICIAL REUSE MODEL

- 250,000 CY DREDGE SEDIMENT PER YEAR
  - COARSER SEDIMENT w MINOR SILTS
  - SILTS & FINES
    - HYDRAULIC PLACEMENT INTO SERIES OF RETENTION BASINS
    - MECHANICAL OFFLOAD VERTICALLY CONSTRUCTED RETENTION BASINS
  - DEWATER & EXCAVATE MATERIAL FOR BENEFICIAL REUSE
    - ROADWAY EMBANKMENT & GENERAL PURPOSE BACKFILL
    - CROSS BLEND SILTS FOR LANDSCAPE APPLICATIONS
PORT OF CLEVELAND’S SEDIMENT PROCESSING FACILITY: MARITIME STAKEHOLDER BENEFITS

- 20+ YEAR DISPOSAL SOLUTION
- PRIVATE MARITIME STAKEHOLDER DREDGE DISPOSAL
- PORT AUTHORITY DREDGE SEDIMENT DISPOSAL
- CERTAINTY CHANNEL TO BE FULLY DREDGED ON AN ANNUAL BASIS
- COSTS SAVINGS 25%+ PER CY TO FEDERAL GOVERNMENT
- LIMITS COSTS TO LOCAL GOVERNMENT SPONSOR
- ENVIRONMENTALLY RESPONSIBLE
- MAXIMIZES HISTORIC INVESTMENT IN EXISTING CDFs
<table>
<thead>
<tr>
<th>Year</th>
<th>Hydraulic (Beneficial Reuse)</th>
<th>Mechanical</th>
</tr>
</thead>
<tbody>
<tr>
<td>2015</td>
<td>100,000</td>
<td>0</td>
</tr>
<tr>
<td>2016</td>
<td>200,000</td>
<td>0</td>
</tr>
<tr>
<td>2017</td>
<td>300,000</td>
<td>0</td>
</tr>
<tr>
<td>2018*</td>
<td>200,000</td>
<td>0</td>
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</tbody>
</table>

**SPMF PERFORMANCE**
PORT OF CLEVELAND’S SEDIMENT PROCESSING FACILITY 2018 EXPANSION

EXISTING

250,000 CY DREDGE SEDIMENT

- COARSER SEDIMENT w/ LESS SILTS
- SILTS & FINES

120,000 CY

- HYDRAULIC PLACEMENT INTO SERIES OF AT GRADE RETENTION BASINS
- MECHANICAL OFFLOAD VERTICALLY CONSTRUCTED RETENTION BASINS

130,000 CY

PROPOSED

250,000 CY DREDGE SEDIMENT

- COARSER SEDIMENT w/ LESS SILTS
- SILTS & FINES

160,000 CY+

- HYDRAULIC PLACEMENT INTO SERIES OF AT GRADE RETENTION BASINS
- MECHANICAL OFFLOAD VERTICALLY CONSTRUCTED RETENTION BASINS

90,000 CY

REDUCE AVAILABLE AIR SPACE CONSUMPTION BY 30%, TURNS A 20 YEAR FACILITY INTO A 26 YEAR FACILITY!
SEDIMENT PROCESSING & MANAGEMENT: BED LOAD INTERCEPTOR

CONCEPT: INTERCEPT SEDIMENT IN PASSIVE MANNER PRIOR TO IT REACHING FEDERAL NAVIGATION CHANNEL

• LESS COSTLY
• SEDIMENT LESS RISK OF BEING CONTAMINATED
• HARNESS FORCE OF MOTHER NATURE
  • HIGH QUALITY SEDIMENT
PORT OF CLEVELAND SEDIMENT PROCESSING & MANAGEMENT: PARTNERS & FUTURE GOALS

PARTNERS:
• OHIO DIVISION OF NATURAL RESOURCES OFFICE OF COASTAL MANAGEMENT
• OHIO ENVIRONMENTAL PROTECTION AGENCY
• UNITED STATES ARMY CORP. OF ENGINEERS, BUFFALO DISTRICT
• KURTZ BROS. INC. (SPMF SITE OPERATOR)
• HULL & ASSOCIATES (ENGINEER OF RECORD)
• STREAMSIDE SYSTEMS (BEDLOAD INTERCEPTOR)

FUTURE GOALS:
• EXPAND BED LOAD INTERCEPTOR CONCEPT & IMPROVE EFFICIENCY
• EXPAND BENEFICAL REUSE MARKET & CONSUMPTION OF MATERIAL
• REDUCE NEED FOR LONG TERM STORAGE OF DREDGE SEDIMENT
• PROVIDE CLEVELAND MARITIME COMMUNITY LONG TERM DREDGE SEDIMENT SOLUTION IN A COST EFFECTIVE & ENVIRONMENTALLY RESPONSIBLE MANNER

THANK YOU!
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Questions & Answers

• Port of Long Beach
  • Are costs for eco-projects recaptured in maritime revenues, rent?
  • Are projected infrastructure projects required to pass certain positive environmental impact thresholds, along with operational and financial ones?

• Port of Cleveland
  • Are there any economic uses for the dredge material?
  • Does the port have any infrastructure re-capture charges in its maritime revenues and tariffs?
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Conclusion and takeaways

• Environmental stewardship is not just a duty and cost of operation, it is a major shield against economic obsolescence.

• Port’s need to assess all true costs of operations, including environmental stewardship

• For decades, shippers have greatly benefitted from tax revenue funded subsidies

• The days of subsidising port clients though is nearing an end; consumers must decided if they will continue to pay subsidies through their taxes or at the point of purchase (ie, the real costs of logistics)
‘A pessimist sees the difficulty in every opportunity; an optimist sees the opportunity in every difficulty.’

Sir Winston Leonard Spencer-Churchill