Forecasting the Future: How Much and How Far?

Rick Cameron
Managing Director of Planning and Environmental Planning
GREEN PORT POLICY
Leading the way in reducing environmental impacts
Updated Cargo Forecast

What is it?

– Joint forecast of both ports’ throughput
– Long-term, unconstrained, projection of demand for the gateway

How will it be Used?

– Port Development Planning
– Environmental Impact Analysis
– The Ports’ Clean Air Action Plan and Emissions Forecasting
– Update of the Long Beach Port Master Plan
– Port and Stakeholder Financing
– Regional Planning Partners
– Strategic Planning
Scenarios

**Economic Scenarios**

**Expected Growth**
- Gradual U.S. Economic Recovery Continues
- U.S. GDP Growth - 2.4% Long-term
- U.S. Trade Growth – 3.9%
- Declining Tariff Rates

**High Growth**
- More Positive Near-term Outlook
- U.S. GDP Growth - 2.7% Long-term
- U.S. Trade Growth – 5.1%
- Aggressive Trade Liberalization

**Low Growth**
- Downside Shocks Near-term
- U.S. GDP Growth - 2.0%
- U.S. Trade Growth – 2.7%

**Competitive Adjustments**

**Base Case**
- Moderation in Largest Vessel Size Growth
- IPI losses to British Columbia
- IPI losses to U.S. Gulf and East Coast Ports

**Upside**
- Continued Growth in Largest Vessel Size
- IPI losses to U.S. Gulf and East Coast Ports Minimized
- IPI losses to British Columbia Minimized

**Downside**
- Vessel Size Weighted Toward Canal Limits
- Additional 1st Call Service in British Columbia
- Significant Route Cost Disadvantage
### Summary of Results

#### 25 Year Forecast of SPB Ports Total Container Volume

<table>
<thead>
<tr>
<th>Year</th>
<th>High Growth</th>
<th>Expected</th>
<th>Low Growth</th>
</tr>
</thead>
<tbody>
<tr>
<td>2015</td>
<td>15.0</td>
<td>16.2</td>
<td>14.5</td>
</tr>
<tr>
<td>2016</td>
<td>16.4</td>
<td>17.5</td>
<td>15.8</td>
</tr>
<tr>
<td>2017</td>
<td>17.8</td>
<td>18.9</td>
<td>17.1</td>
</tr>
<tr>
<td>2018</td>
<td>19.2</td>
<td>20.3</td>
<td>18.5</td>
</tr>
<tr>
<td>2019</td>
<td>20.6</td>
<td>21.7</td>
<td>19.9</td>
</tr>
<tr>
<td>2020</td>
<td>22.0</td>
<td>23.1</td>
<td>21.4</td>
</tr>
<tr>
<td>2021</td>
<td>23.4</td>
<td>24.5</td>
<td>22.8</td>
</tr>
<tr>
<td>2022</td>
<td>24.8</td>
<td>25.9</td>
<td>24.2</td>
</tr>
<tr>
<td>2023</td>
<td>26.2</td>
<td>27.3</td>
<td>25.6</td>
</tr>
<tr>
<td>2024</td>
<td>27.6</td>
<td>28.7</td>
<td>27.0</td>
</tr>
<tr>
<td>2025</td>
<td>29.0</td>
<td>30.1</td>
<td>28.4</td>
</tr>
<tr>
<td>2026</td>
<td>30.4</td>
<td>31.5</td>
<td>29.8</td>
</tr>
<tr>
<td>2027</td>
<td>31.8</td>
<td>32.9</td>
<td>31.2</td>
</tr>
<tr>
<td>2028</td>
<td>33.2</td>
<td>34.3</td>
<td>32.6</td>
</tr>
<tr>
<td>2029</td>
<td>34.6</td>
<td>35.7</td>
<td>34.0</td>
</tr>
<tr>
<td>2030</td>
<td>36.0</td>
<td>37.1</td>
<td>35.4</td>
</tr>
<tr>
<td>2031</td>
<td>37.4</td>
<td>38.5</td>
<td>36.8</td>
</tr>
<tr>
<td>2032</td>
<td>38.8</td>
<td>39.9</td>
<td>38.2</td>
</tr>
<tr>
<td>2033</td>
<td>40.2</td>
<td>41.3</td>
<td>39.6</td>
</tr>
<tr>
<td>2034</td>
<td>41.6</td>
<td>42.7</td>
<td>41.0</td>
</tr>
<tr>
<td>2035</td>
<td>43.0</td>
<td>44.1</td>
<td>42.4</td>
</tr>
<tr>
<td>2036</td>
<td>44.4</td>
<td>45.5</td>
<td>43.8</td>
</tr>
<tr>
<td>2037</td>
<td>45.8</td>
<td>46.9</td>
<td>45.2</td>
</tr>
<tr>
<td>2038</td>
<td>47.2</td>
<td>48.3</td>
<td>46.6</td>
</tr>
<tr>
<td>2039</td>
<td>48.6</td>
<td>49.7</td>
<td>48.0</td>
</tr>
<tr>
<td>2040</td>
<td>50.0</td>
<td>51.1</td>
<td>49.4</td>
</tr>
</tbody>
</table>

**CAGR 15' to 40'**

<table>
<thead>
<tr>
<th></th>
<th>Base</th>
<th>Upside</th>
<th>Downside</th>
</tr>
</thead>
<tbody>
<tr>
<td>High</td>
<td>5.1%</td>
<td>5.2%</td>
<td>4.9%</td>
</tr>
<tr>
<td>Expected</td>
<td>4.0%</td>
<td>4.1%</td>
<td>3.8%</td>
</tr>
<tr>
<td>Low</td>
<td>2.9%</td>
<td>3.1%</td>
<td>2.8%</td>
</tr>
</tbody>
</table>
Sources and Challenges
Diesel Particulate Matter: Down 84%

Nitrogen Oxides: Down 48%

Sulfur Oxides: Down 97%

Greenhouse Gases: Down 14%

*Compared to 2005 Levels
Clean Air Goals

- **Diesel Particulate Matter**
  - 2015: 84%
  - 2023: 77%

- **Nitrogen Oxides**
  - 2015: 48%
  - 2023: 59%

- **Sulfur Oxides**
  - 2015: 97%
  - 2023: 93%
Health Risk Assessment Results
Emissions Benefits

- **DPM Actual and Forecasted Reductions**

![Graph showing DPM Actual and Forecasted Reductions from 2005 Baseline to 2014, with actual and forecasted emissions data.]
Emissions Benefits

- **NOx Actual and Forecasted Reductions**

![Graph showing NOx emissions reduction from 2005 baseline to 2014.](image)

- **2005 Baseline Level**
- **Actual Emissions**
- **2007 Forecasted Emissions**
- **2009 Forecasted Emissions**

The graph illustrates the reduction in NOx emissions from 2005 baseline to 2014, showing actual emissions and forecasted emissions for the years 2007 and 2009.
Emissions Benefits

- **SOx Actual and Forecasted Reductions**

![Graph showing SOx emissions reduction](image)
Planning Approach

• **Goals**
  - Meet Throughput Targets
  - Big Ship Priority
  - Respect Existing Constraints

• **Scenarios**
  - Conventional “Mega-Terminals”
  - Electrification
  - Densify Intermodal Yards
  - Automation
  - Short-haul Shuttles
  - Max Containers South of Ocean Blvd.

• **Evaluation Criteria**
  - Capacity
  - Revenue
  - Vessel Access
  - Use of Rail
  - Emissions
  - Traffic
  - Efficiency
  - Utilization
  - Cost
  - Employment
  - Accessibility
  - Resiliency
Tools

• Graphically driven, integrated, suite of models

• Inputs
  • High Level Terminal Layout
  • Equipment and Operating Assumptions
  • Known Constraints and Conditions
  • Historical Port and Terminal Operating Data

• Outputs
  • Terminal Capacity (Berth, Storage, Intermodal)
  • Vessel / Rail / Gate / Road Activity
  • Emissions Factors
  • Equipment Power Requirements
  • Labor Needs
  • Additional Evaluation Criteria
Current Configuration

- **13.9 M TEUs**
- **Big Ships:** 3 terminals, 5 berths
- **2.3 M TEUs on dock rail**
- **32,900 trks/day**
- **1.3M t/year CO₂**
- **7,630 FTE per million TEUs**
Example - Mega Terminals “1” Stacking Cranes

20.5 M TEUs

Big Ships:
5 terminals
12 berths

4.2 M TEUs on
dock rail

45,200 trks/day

1.4M t/year CO₂

6,740 FTE
per million TEUs
Road and Rail Volumes

![Bar chart showing annual volumes for existing and future scenarios.](chart.png)

- **Existing**
  - On-Dock Rail Volume: 4,000,000
  - Off-Dock Rail Volume: 1,000,000
  - Road Volume: 2,000,000

- **Mega 1 Traditional**
  - On-Dock Rail Volume: 8,000,000
  - Off-Dock Rail Volume: 3,000,000
  - Road Volume: 5,000,000

- **Mega 1 ASC**
  - On-Dock Rail Volume: 12,000,000
  - Off-Dock Rail Volume: 6,000,000
  - Road Volume: 9,000,000

- **Mega 2 ASC**
  - On-Dock Rail Volume: 16,000,000
  - Off-Dock Rail Volume: 9,000,000
  - Road Volume: 12,000,000
Emissions – Based on 2014 Inventory
Priorities

Project Objectives
- Robust & Flexible Tools
- Incorporate New Forecast
- Integrate with related Port Initiatives
- Stakeholder Input

Evaluation Criteria
- Facility Performance
- Supply Chain Velocity
- Environmental Stewardship
- Energy Demand
- Account for Operational Changes/Improvements
- Plan for Support Uses
- Department-wide Collaboration
- Financial Impacts
- Regional Economic Impact
- Traffic & Transportation Impacts
Thank You