IMPACT OF THE
PANAMA CANAL AND MARKET
OPPORTUNITY FOR TEXAS

Presentation By: Dr. Alexander Metcalf

TEMS
Transportation Economics & Management Systems, Inc.
Texas is Growing Strongly

- Texas GDP has been growing by 7 percent each year
- Texas added 1.3 million people from 2010 to 2013
- Population to grow from 26 million today to 40 million by 2050.

Texas Transportation System needs increase efficiency and capacity to meet future needs.
SUSTAINED GROWTH IS FORECASTED

Historically, Texas GDP growth rate has been significantly higher than US growth Rate. “Forecasts from the Texas Comptroller of Public Accounts predict that the U.S. and Texas economies will rebound from the current recession (in terms of GSP and GDP), and grow at 2.6 percent and 3.37 percent, respectively, on average, per year between 2010 and 2035 (Figure 2-1). An efficient and well-maintained transportation system is vital to the state’s ability to remain economically competitive at home and abroad.”

The Texas Comptroller Forecast is in REAL DOLLARS

Adding a 2% annual inflation gets us right back into the 5+% range.

Average growth rate will be 5.4% (NOMINAL DOLLARS) for the Texas market area

CONTAINER IMPORTS ARE CLOSELY LINKED TO NOMINAL GDP

Growth rate has only been moderated by recent recession.
Texas Market is 3rd Largest in the US

Only after California and NY/NJ (which is divided between the two states)

New York Port is divided between two states

Top 13 States Containerized Tonnage (Source: US Census)
However, DFW and most of Texas are currently served out of LA/LB.

US Asia Port Hinterlands Today

Houston Estimated Share:
72% of Dominant Hinterland, but it is a very localized service area.

235K TEUs

This is due to big ships on the West Coast versus small ships in Houston; but Houston fares no worse than East Coast Ports in regard to serving only its local (truck) port hinterland area. Most of Houston’s traffic today is European and Caribbean-based.
Currently Houston’s share of Asian containers is 22% of Texas market. This results from the economics of small ships, where small vessels currently hold more than 50% market share vs. the West Coast in Houston. Houston currently has only a negligible share of DFW market, but Texas ports share will increase with large ships provided they have effective access to the DFW market.
DFW Asian Container Market Will Grow by a Factor of Three

This growth will put a lot of strain on existing rail infrastructure and capacity
CURRENT COST TRADEOFF: SMALL SHIPS

Delivered Cost per TEU from China:

<table>
<thead>
<tr>
<th>To DFW</th>
<th>To Houston</th>
</tr>
</thead>
<tbody>
<tr>
<td>Via LA/LB: $147 + $180 + $299 = $626</td>
<td>Via LA/LB: $147 + $180 + $317 = $644</td>
</tr>
<tr>
<td>Via Houston: $479 + $180 + $161 = $820</td>
<td>Via Houston Direct: $479 + $180 = $659</td>
</tr>
</tbody>
</table>

Clear Advantage to LA/LB

About Equal
PANAMA CANAL WILL CHANGE THE SITUATION

Capacity of New Panamax ship will increase 2-3 times, but requires 48-51 feet draft. Only a few Gulf and East Coast ports can support this, but in the long term Freeport will be able to accommodate these larger ships.
ECONOMIES OF SCALE FOR BIGGER SHIPS

• 2015 Shipping cost will decrease from $0.04/TEU·Mile to $0.02/TEU·Mile (70% loading factor and inflation since 2001).
• *This cuts shipping line-haul costs in half.*
• East Coast Ports are expanding their capabilities, so Big Ships will be used in both Pacific and Atlantic (e.g. Suez) trade lanes.

Source: Reproduced based on Figure 4.3 Impacts of Containership Size, Service Routes, and Demand On Texas Gulf Ports, TXDOT, 2001
**BIG SHIPS COME TO THE GULF AND EAST COAST FROM ASIA. THIS TIPS THE COMPETITIVE BALANCE**

After Panama Canal Expansion

**Room to grow?**

- Freeport Estimated Share:
  - 40% of Dominant Area
  - 10% of Competitive Area

- **1287K TEUs** Freeport Competitive Market Area (Outside)
- **1451K TEUs** Freeport Dominant Market Area

*The Competitive Balance with the West Coast Ports will change dramatically if a South Texas port has 50 feet of water and an effective inland distribution network*
FUTURE COST TRADEOFF: LARGE SHIPS

Delivered Cost per TEU from China:

<table>
<thead>
<tr>
<th>To DFW:</th>
<th>To Houston:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Via LA/LB: $147 + $180 + $299 =</td>
<td>Via Houston: $240 + $180 + $161 =</td>
</tr>
<tr>
<td>$626</td>
<td>$581</td>
</tr>
<tr>
<td>Via Houston Direct: $240+ $180 =</td>
<td></td>
</tr>
<tr>
<td>$420</td>
<td></td>
</tr>
</tbody>
</table>

Advantage to Houston

Clear Advantage to Houston

FEASIBILITY
**Notes:**

1. Estimate approx. 750,000 containers total IMX market in and out of DFW today.
2. Freeport will come online between 2020 and 2025. By 2025 fully operational.
3. Freeport would add rail European boxes that are currently trucked which results in an immediate boost in rail traffic.
**OVERALL FREEPORT CONTAINER MARKET FORECAST**

- **2014**
  - 1.1 Million TEUs
    - Europe: 426,000
    - Asia: 709,000

- **2035**
  - 3.2 Million TEUs
    - Europe: 1,130,305
    - Asia: 2,029,824
**Rail Integration for Port Freeport**

*Concept Study envisioned*

- **Port Freeport Improvements**
- **Rail Link to Inland Ports at:**
  - **Dallas**
  - **Fort Worth**
  - **San Antonio**
- **Integrated Hub at:**
  - **Rosenberg**
Rosenberg has excellent Access along I-69 and BW-8 to 50% of the existing regional distribution base: located along the ring roads around the West and North sides of Houston.

It also has excellent Access along BW-8 back to the Ship Channel area.
**EXAMPLE: CSX WINTER HAVEN FACILITY**

- **318 Acres rail facility, surrounded by 930 acres reserved for development of up to 7.9 million square feet of warehouse distribution centers**

- **Projected at full build-out, the Winter Haven ILC will create 8,500 annual jobs with a total annual payroll of $282.2 million.**

**References:**

- http://railtec.illinois.edu/RREC/presentations/A/04/19_Brinker.pdf
PRELIMINARY FINANCIAL ANALYSIS

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>IMX Revenues</td>
<td>$1,633,683</td>
</tr>
<tr>
<td>Car Revenues</td>
<td>$405,251</td>
</tr>
<tr>
<td><strong>Total Revenue</strong></td>
<td><strong>$2,038,934</strong></td>
</tr>
<tr>
<td>GF Capital Cost</td>
<td>$807,769</td>
</tr>
<tr>
<td>Track Mtce Cost Oper</td>
<td>$389,014</td>
</tr>
<tr>
<td>Track Mtce Cost Cap</td>
<td>$189,503</td>
</tr>
<tr>
<td>Admin Cost</td>
<td>$85,635</td>
</tr>
<tr>
<td><strong>Total Cost</strong></td>
<td><strong>$1,471,922</strong></td>
</tr>
<tr>
<td><strong>NET</strong></td>
<td><strong>$567,012</strong></td>
</tr>
<tr>
<td><strong>IRR</strong></td>
<td><strong>7.79%</strong></td>
</tr>
</tbody>
</table>

- Conceptual Analysis undertaken from the point of view of the Railroad Authority, in nominal year of expenditure (YOE) dollars. Freeport to Caldwell est. cost $880 million assumed in operation by 2025
- This analysis is based on 40¢ per car mile and $28.41 per Loaded TEU (assuming 100% empty return)
- Due to the length of the route and forecasted tonnage, operating and capital maintenance is a significant component of the corridor’s cost structure, which must be recovered through usage fees.
- At a competitive tolling level and existing carload traffic north of Rosenberg to Caldwell; 4.4% interest and 1.4% inflation the NPV is $567 million positive: this suggests that an infrastructure authority could fully service its Bonds from fees without needing subsidy or grant assistance.
- More study is needed to positively confirm costs and revenues, but suggests potential for a RRIF loan or use of Revenue Bonds as a low-cost financing vehicle for developing needed infrastructure improvements
SH 36A RAIL CORRIDOR JOB CREATION

- Current modeling suggests rail traffic volumes will continue to increase and UP and BNSF will need to develop additional rail yard capacity in the Houston area.

- Rosenberg is well positioned in the future to become a major rail logistics hub. Shifting intermodal activity from UP Englewood and BNSF Pearland to Rosenberg would reduce rail congestion in downtown Houston.

- Overall, potential is 15,000 - 30,000 jobs likely in the SH 36A corridor, mostly consisting of distribution and industrial jobs.
SH 36A Rail Income Impacts – Income and Sales Tax Revenues by 2035

Total Income Increase (million $ per Year)

- Direct Jobs: $425
- Direct Jobs and Indirect Jobs: $768

Total State Sales Tax Increase (million $ per Year)

- Direct Jobs: $44
- Direct Jobs and Indirect Jobs: $24
PORTS ALLIANCE FOR TEXAS?

• The ports of Seattle and Tacoma joined forces in August 2015 to unify management of our marine cargo facilities and business to strengthen the Puget Sound gateway and attract more marine cargo and jobs for the region.

• The ports together have nine container terminals, but none of them are currently able to effectively handle big ships.

• “We used to think, the more competition the better,” said Jock O’Connell, an international trade economist. But the advent of ultra-large ships, some of which can carry up to 20,000 cargo containers, has thrown port operations for a loop, he said.

• Bookout says if the seaports in Seattle and Tacoma want to remain a destination for cargo ships, they must invest. "We don't have a choice," she said. "We can't choose to just handle small ships. We need to have the facilities that will handle the ships of the future."

THANK YOU

FOR MORE INFORMATION CONTACT
ALEXANDER E. METCALF, PHD
PRESIDENT
TEMS
301-846-0700
AMETCALF@TEMSINC.COM