Canada’s Gateways and Trade Corridors: System-wide Approach

Need **objective fact-based metrics** to:

- Transparency
- Respond to anecdotal claims of (un)reliability
- Provide reliable and objective benchmarks for industry
- Market and promote Canada’s gateways efficiently
North American Container Port Traffic Market Share (TEU) by Country, 2000 vs. 2010

- Mexico’s share of North American port traffic grew from 4% in 2000 to 7% in 2010.

- Canada’s share remained constant at around 9% during the same period.

- However, where Canadian ports have gained most in North American market share is on the West Coast.

Source: American Association of Port Authorities and Canada Port Authorities
# North American West Coast Container Ports 2011

<table>
<thead>
<tr>
<th>Rank</th>
<th>Country</th>
<th>Port</th>
<th>TEUs 2011</th>
<th>% growth over 2010</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>🇺🇸</td>
<td>Los Angeles</td>
<td>7,993,430</td>
<td>1.3%</td>
</tr>
<tr>
<td>2</td>
<td>🇺🇸</td>
<td>Long Beach</td>
<td>6,061,085</td>
<td>-3.2%</td>
</tr>
<tr>
<td>3</td>
<td>🇨🇦</td>
<td>Vancouver</td>
<td>2,507,032</td>
<td>-0.3%</td>
</tr>
<tr>
<td>4</td>
<td>🇺🇸</td>
<td>Oakland</td>
<td>2,342,504</td>
<td>0.5%</td>
</tr>
<tr>
<td>5</td>
<td>🇺🇸</td>
<td>Seattle</td>
<td>2,033,535</td>
<td>-4.7%</td>
</tr>
<tr>
<td>6</td>
<td>🇺🇸</td>
<td>Tacoma</td>
<td>1,488,795</td>
<td>2.3%</td>
</tr>
<tr>
<td>7</td>
<td>🇲🇽</td>
<td>Manzanillo</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>8</td>
<td>🇲🇽</td>
<td>Lázaro Cárdenas</td>
<td>953,497</td>
<td>19.8%</td>
</tr>
<tr>
<td>9</td>
<td>🇨🇦</td>
<td>Prince Rupert</td>
<td>410,469</td>
<td>19.5%</td>
</tr>
<tr>
<td>10</td>
<td>🇺🇸</td>
<td>Portland</td>
<td>197,446</td>
<td>9.0%</td>
</tr>
</tbody>
</table>

Source: port authorities

Transport Canada - Economic Analysis
Original Policy Question

Are Canadian Supply Chains Reliable?

Fluidity Indicator

Port Utilization Indicators

Import Vessel Forecast

Air Cargo

Supply Chain Resilience

Integrated Approach

Transport Canada - Economic Analysis
PORT UTILIZATION INDICATORS
PORT UTILIZATION INDICATORS (PUI)

Intermodal Indicators (4 partner ports):
1. Average Vessel Turnaround Time (1) [sec./TEU]
2. Average Vessel Turnaround Time (2) [Hours]
3. Berth Utilization [TEU/m]
4. Average Truck Turnaround Time [Min.]
5. Gate Congestion Indicator [Index]
6. Average Container Dwell Time [Days]
7. Average vessel (un)load [TEU/vessel]
8. Gross Port Productivity [TEU/Gross Ha]
9. Crane Productivity [TEU/STS crane]

Bulk Indicators (7 partner ports):
1. Berth Occupancy Rate [%]
2. Gross Berth Productivity [T / berth-hr]
3. Average Vessel Turnaround Time [Hours]
4. Average vessel (un)load [T / vessel]
5. Vessel Queuing (new in 2012) [Time at berth/Time in port]
### B.C. CONTAINER PORTS SCORECARD 2011

#### Indicators

<table>
<thead>
<tr>
<th></th>
<th></th>
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<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Gate Fluidity Index</td>
<td>100</td>
<td>99</td>
<td>78</td>
<td>78</td>
<td>88</td>
<td>83</td>
<td>97</td>
<td>102</td>
<td>95</td>
<td>92</td>
<td>110</td>
<td>93</td>
<td>N/A</td>
<td>N/A</td>
<td>12%</td>
</tr>
<tr>
<td>2. Avg. Truck Turnaround Time - Minutes</td>
<td>25.9</td>
<td>26.8</td>
<td>28.6</td>
<td>29.6</td>
<td>26.5</td>
<td>26.0</td>
<td>25.2</td>
<td>24.5</td>
<td>24.5</td>
<td>26.4</td>
<td>27.0</td>
<td>27.0</td>
<td>27.2</td>
<td>26.7</td>
<td>23.9</td>
</tr>
<tr>
<td>3. Berth Utilization - TEU/Meter</td>
<td>65.6</td>
<td>60.8</td>
<td>61.1</td>
<td>69.1</td>
<td>72.4</td>
<td>73.8</td>
<td>80.2</td>
<td>78.9</td>
<td>82.4</td>
<td>75.6</td>
<td>75.8</td>
<td>76.4</td>
<td>72.7</td>
<td>69.7</td>
<td>4%</td>
</tr>
<tr>
<td>4. Vessel Turnaround Time - Sec/TEU</td>
<td>36</td>
<td>34</td>
<td>45</td>
<td>39</td>
<td>39</td>
<td>38</td>
<td>37</td>
<td>35</td>
<td>35</td>
<td>33</td>
<td>36</td>
<td>39</td>
<td>37.4</td>
<td>37.3</td>
<td>0%</td>
</tr>
<tr>
<td>5. Vessel Turnaround Time - Hours/Vessel Call</td>
<td>33.1</td>
<td>28.1</td>
<td>36.5</td>
<td>32.4</td>
<td>31.9</td>
<td>33.0</td>
<td>31.7</td>
<td>30.4</td>
<td>34.0</td>
<td>30.9</td>
<td>35.0</td>
<td>34.5</td>
<td>32.6</td>
<td>38.6</td>
<td>-15%</td>
</tr>
<tr>
<td>6. Avg. Container Dwell - Days</td>
<td>2.56</td>
<td>3.17</td>
<td>2.63</td>
<td>2.45</td>
<td>2.29</td>
<td>2.38</td>
<td>1.93</td>
<td>2.25</td>
<td>2.48</td>
<td>2.29</td>
<td>1.97</td>
<td>2.47</td>
<td>2.41</td>
<td>3.06</td>
<td>-21%</td>
</tr>
<tr>
<td>7. Port Productivity - TEU/gross ha</td>
<td>1,359</td>
<td>1,268</td>
<td>1,251</td>
<td>1,437</td>
<td>1,482</td>
<td>1,488</td>
<td>1,563</td>
<td>1,550</td>
<td>1,619</td>
<td>1,486</td>
<td>1,500</td>
<td>1,502</td>
<td>1,459</td>
<td>1,426</td>
<td>2%</td>
</tr>
<tr>
<td>8. Crane Productivity - TEU/STS crane</td>
<td>7,508</td>
<td>6,950</td>
<td>6,970</td>
<td>7,900</td>
<td>8,291</td>
<td>8,462</td>
<td>9,257</td>
<td>9,077</td>
<td>9,482</td>
<td>8,696</td>
<td>8,706</td>
<td>8,789</td>
<td>8,341</td>
<td>7,989</td>
<td>4%</td>
</tr>
<tr>
<td>9. Number of vessel calls</td>
<td>69</td>
<td>71</td>
<td>77</td>
<td>78</td>
<td>89</td>
<td>83</td>
<td>82</td>
<td>81</td>
<td>76</td>
<td>77</td>
<td>78</td>
<td>79</td>
<td>78</td>
<td>64</td>
<td>22%</td>
</tr>
</tbody>
</table>

#### Source:
Transport Canada

#### Notes:

All figures are weighted averages of the two B.C. ports. They represent the 5 container terminals in Vancouver and Prince Rupert.

1. A measure of truck wait times at terminal gates. This indicator will be available in January 2011.
2. For fully cellular container ships only. Excludes ro-ro and mixed cargo ships.
3. Dwell time is defined as the time a container spends within a gated marine terminal facility. Dwell times are for import to rail movements only. Under this project, dwell time begins when the container is discharged off the vessel and to the time it is loaded onto rail car.

TEU: twenty-foot equivalent unit, a standard measurement of container activity.

STS: ship-to-shore.
Container Dwell Time vs. Port Throughput at B.C. Ports, 2009-YTD 2012

Source: Transport Canada
FLUIDITY INDICATOR SUPPLY CHAIN ARCHITECTURE
PHASE 1 CORRIDORS: ASIA-PACIFIC

- Hong Kong
- Shanghai

PRINCE RUPERT ➔

VANCOUVER ➔

Calgary
Toronto
Montreal
Chicago

Calgary
Toronto
Montreal
Chicago
A CONTAINER JOURNEY THROUGH THE PACIFIC GATEWAY

[MODEL BELOW EXCLUDES TRANSLOAD]

Shanghai
Hong Kong

Prince Rupert

Vancouver

Deltaport

MTD

Rail Transit

RTD

Drayage

DC

Chicago

Toronto

Ocean Transit

MTD

Rail transit

RTD

Drayage

DC

All truck transit

: gateway/ inland hub  : marine  : rail  : trucking

Transport Canada - Economic Analysis
GREATER VANCOUVER TRANSLOAD ACTIVITIES

**Total Rail to Eastern Canada and U.S. 85%**

- **63% By rail**
  - (marine containers)
  - **15.8% via intermodal yards**
  - **47.3% direct rail**
  - **Additional volumes via intermodal yards 22%**

Marine Terminals

- **37% leaving by truck**

**Import transload facilities**

- **26% to import transloads**
- **2% to intermodal yards**
- **20% Back to intermodal yards**

**Lower Mainland Intermodal yards**

- **53’**

**Back to intermodal yards 20%**

**Direct U.S. <1%**

**Direct Western Can. 9%**

- **2% to B.C. customers**
- **4% to other Can destinations**

**Source:** Transload Mapping Study 2011. Proportions Based on 2009 volumes
SUPPLY CHAIN TIME COMPONENTS MEASURED

Ocean & Port
- Ocean transit [1]
- Marine Terminal Dwell [2]

Rail
- Dwell at origin rail yard [1]
- Rail transit time (intra-urban) [2]
- Rail transit time (inter-urban) [3]
- Dwell at dest. rail yard [4]

Trucking
- Truck from marine terminal to origin rail yard [1]
- Truck from marine terminal to end customer [2]
- Truck from marine terminal to transload facility [3]
- Truck from transload facility to origin rail yard [4]
- Truck from transload facility to end customer [5]
- Truck from shipper warehouse to origin airport [6]
- Truck from primary destination airport to secondary destination airport [7]
- Truck from destination airport to DC/warehouse [8]

Air
- Dwell at origin airport [1]
- Air transit [2]
- Dwell at destination airport [3]
- Dwell at secondary destination airport [4]

Logistics and Warehousing
- Dwell at transload facility
## SUPPLY CHAINS – VARIOUS MODELS (B.C. PORTS)

<table>
<thead>
<tr>
<th>SUPPLY CHAIN</th>
<th>Stages</th>
<th>Direct rail</th>
<th>Rail via intermodal yard- Drayage</th>
<th>Pure Rail via intermodal yard</th>
<th>Transload - Rail</th>
<th>Transload - Truck</th>
<th>All-Truck</th>
<th>Direct air</th>
<th>Dual airport</th>
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</thead>
<tbody>
<tr>
<td>1</td>
<td>1 + 2 + 3 + 4</td>
<td>53%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>18%</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>2</td>
<td>1 + 2 + 1 + 1 + 3 + 4</td>
<td>2%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>1 + 2 + 1 + 2 + 3 + 4</td>
<td>14%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>1 + 2 + 3 + 4 + 1 + 3 + 4</td>
<td>18%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>1 + 2 + 2</td>
<td>8%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>1 + 2 + 3 + 5</td>
<td>5%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>6 + 1 + 2 + 3 + 8</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>6 + 1 + 2 + 3 + 7 + 4 + 8</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>N/A</td>
<td></td>
</tr>
</tbody>
</table>
Supply Chain 1: Direct Rail

Time components included

- Ocean transit
- Port dwell
- Inter-urban rail transit
- Dwell at destination railyard
FLUIDITY INDICATOR
DATA & METHODOLOGY
DATA SOURCES

Ocean & Port
Ocean transit:
• Lloyd’s List Intelligence
  Seasearcher

Marine terminal dwell:
• Canada Port Authorities

Rail
Railyard dwell:
• CN Rail & CP Rail

Rail transit:
• CN Rail & CP Rail

Trucking
Truck transit times:
• Third party GPS and satellite providers

Transloading
Transload dwell:
• Lower Mainland Transload Mapping Study 2010 (Culham Business Solutions)
DATA REPRESENTATIVENESS

• **Ocean transit**
  – 98% of vessel movements covered

• **Port dwell**
  – 100% of universe covered

• **Rail transit**
  – 100% of universe covered

• **Rail terminal dwell**
  – 100% of universe covered

• **Trucking**
  – Inter-urban: ≈ 40% sample
  – 90 major O-D pairs
  – Drayage: ≈ 5% sample

• **Transload**
  – ≈50% of universe covered
EXAMPLE: APL IRIS
PACIFIC SOUTH 1 SERVICE EASTBOUND – NOVEMBER 2010

Port Rotation: Laem Chabang → Singapore → Yantian → Hong Kong → Seattle → Vancouver

Example Calculation HONG KONG-VANCOUVER:
Laem Chabang-Singapore = 2.26 days
Dwell @ Singapore = 1.22 days
Singapore-Yantian = 4.89 days
Dwell @ Yantian = 0.55 days
Yantian-Hong Kong = 0.25 days
Dwell @ Hong Kong = 0.65 days
Hong Kong-Shanghai = 2.11 days
Dwell @ Shanghai = 0.51 days
Shanghai-Seattle = 11.01 days
Dwell @ Seattle = 2.65 days
Seattle-Vancouver = 0.39 days

TOTAL TRANSIT TIME HONG KONG TO VANCOUVER = 16.7 days
(TOTAL TRANSIT TIME OF EASTBOUND SERVICE = 26.5 days)
FLUIDITY INDICATOR
Results 2010-2011
Total Transit Time from Shanghai to Various Destinations via B.C. Ports, 2010-2012 YTD

Supply Chain 1 – direct rail

Source: Transport Canada
Total Transit Time from Hong Kong to Toronto via B.C. Ports (direct rail)

<table>
<thead>
<tr>
<th>Month</th>
<th>2010</th>
<th>2011</th>
<th>2012</th>
<th>% change 2010/11</th>
<th>% change 2011/12</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jan</td>
<td>24.5</td>
<td>25.3</td>
<td>26.8</td>
<td>3%</td>
<td>6%</td>
</tr>
<tr>
<td>Feb</td>
<td>22.9</td>
<td>25.5</td>
<td>26.2</td>
<td>11%</td>
<td>3%</td>
</tr>
<tr>
<td>Mar</td>
<td>22.2</td>
<td>26.1</td>
<td>17%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Apr</td>
<td>22.5</td>
<td>24.9</td>
<td>11%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>May</td>
<td>22.4</td>
<td>25.3</td>
<td>13%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>June</td>
<td>23.7</td>
<td>24.9</td>
<td>5%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>July</td>
<td>22.6</td>
<td>24.6</td>
<td>9%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Aug</td>
<td>21.9</td>
<td>25.1</td>
<td>15%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sept</td>
<td>23.1</td>
<td>25.9</td>
<td>12%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Oct</td>
<td>23.6</td>
<td>25.3</td>
<td>8%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nev</td>
<td>24.5</td>
<td>24.7</td>
<td>1%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dec</td>
<td>25.3</td>
<td>25.8</td>
<td>2%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Average</td>
<td>23.5</td>
<td>25.3</td>
<td>26.5</td>
<td>8%</td>
<td>5%</td>
</tr>
</tbody>
</table>

Source: Transport Canada
While average total transit time from HK-TOR deteriorated from 2010 to 2011, *landside performance actually improved over that period*. Gains on the landside were offset by longer ocean transits.
Container Import Vessel Forecast
G2B Approach

• **Objective:**
  – Consolidate and *streamline* data sharing process
  – Increase visibility of inbound container volumes
  – Relay Advance Cargo Information (ACI) data to key gateway operators to establish more accurate *inbound container forecasting*

• Advanced planning and *allocation of rail and marine terminal resources*

• **Dissemination** approach:
  – TC custodian of raw data (protected)
  – Daily aggregated level reports to gateway operators
## Results of Inbound Container Forecasting Pilot Test – March 2012

<table>
<thead>
<tr>
<th>Vessel</th>
<th># of Shipping Lines Represented</th>
<th>Forecast Window (Days)</th>
<th>Forecast # of Cont.</th>
<th>Actual Cont.</th>
<th>Variance</th>
<th>Accuracy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vessel 1</td>
<td>4</td>
<td>14</td>
<td>822</td>
<td>788</td>
<td>+34</td>
<td>96%</td>
</tr>
<tr>
<td>Vessel 2</td>
<td>4</td>
<td>14</td>
<td>707</td>
<td>694</td>
<td>+13</td>
<td>98%</td>
</tr>
<tr>
<td>Vessel 2</td>
<td>4</td>
<td>15</td>
<td>893</td>
<td>859</td>
<td>+34</td>
<td>96%</td>
</tr>
<tr>
<td>Vessel 4</td>
<td>4</td>
<td>14</td>
<td>878</td>
<td>865</td>
<td>+13</td>
<td>99%</td>
</tr>
<tr>
<td>Vessel 5</td>
<td>2</td>
<td>14</td>
<td>1,772</td>
<td>1,705</td>
<td>+67</td>
<td>96%</td>
</tr>
<tr>
<td>Vessel 6</td>
<td>2</td>
<td>14</td>
<td>2,193</td>
<td>2,182</td>
<td>+11</td>
<td>99%</td>
</tr>
<tr>
<td>Vessel 7</td>
<td>1</td>
<td>13</td>
<td>2,307</td>
<td>2,342</td>
<td>-35</td>
<td>99%</td>
</tr>
<tr>
<td>Vessel 8</td>
<td>4</td>
<td>15</td>
<td>1,026</td>
<td>1,009</td>
<td>+17</td>
<td>98%</td>
</tr>
<tr>
<td>Vessel 9</td>
<td>1</td>
<td>13</td>
<td>1,713</td>
<td>1,696</td>
<td>+17</td>
<td>99%</td>
</tr>
<tr>
<td>Vessel 10</td>
<td>2</td>
<td>13</td>
<td>2,038</td>
<td>2,023</td>
<td>+15</td>
<td>99%</td>
</tr>
<tr>
<td>Vessel 11</td>
<td>4</td>
<td>14</td>
<td>994</td>
<td>981</td>
<td>+13</td>
<td>99%</td>
</tr>
</tbody>
</table>
CONCLUSION

• Canada’s Supply Chain Performance Monitoring Initiatives provide evidence-based quantification of the reliability of Canadian gateways and supply chains

• Greater accountability and transparency in the supply chain will benefit all gateway users

• Partnership approach in a win-win context

• Next steps: air cargo and containerized export movements

Thank you / Merci