Measuring Supply Chain Performance

A Government Perspective

APCGI Workshop

Toronto

June 18, 2010

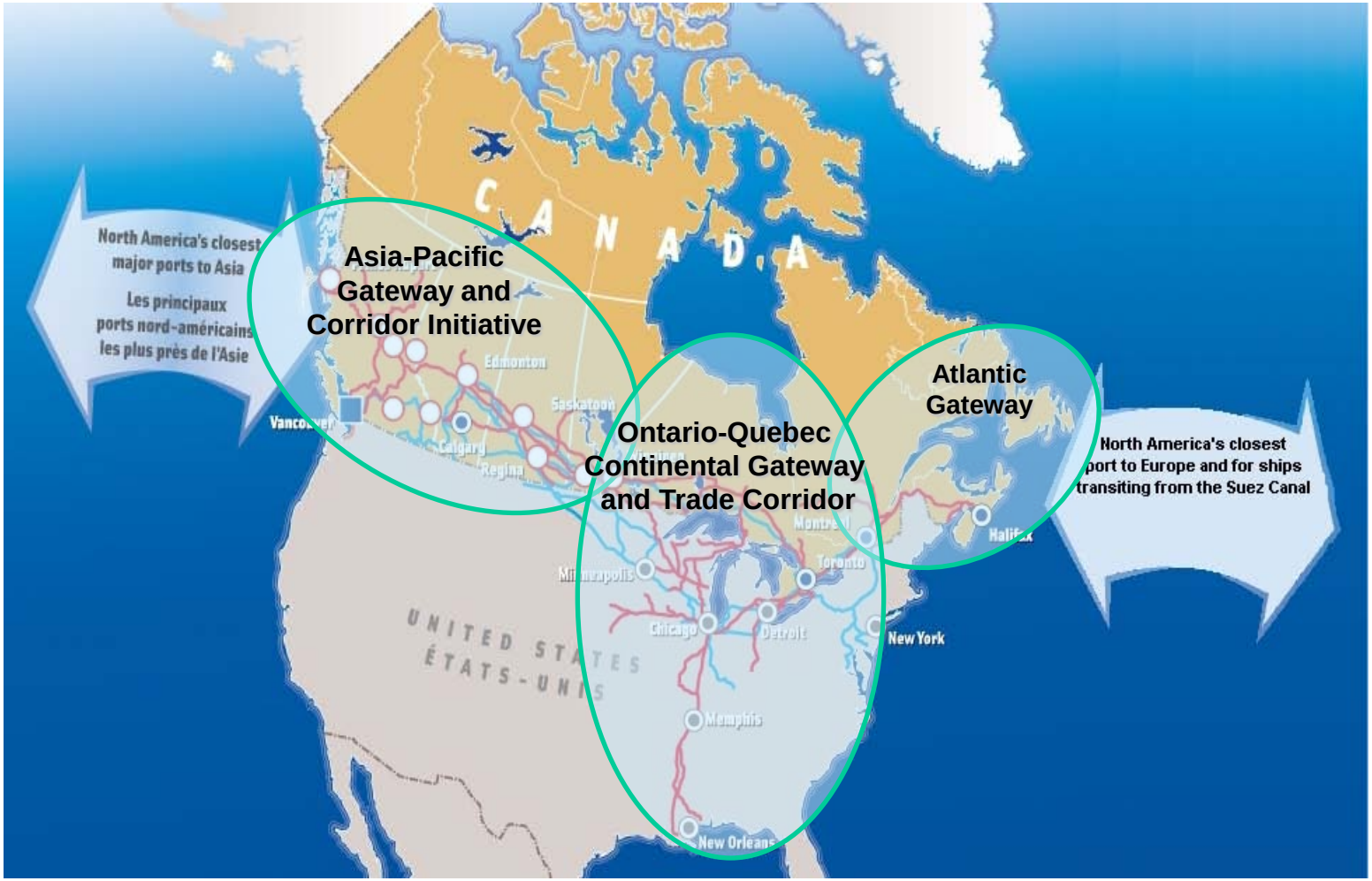
Agenda

Why should governments measure supply chain performance?

1. Policy Context
2. Supply Chain Metrics at Transport Canada:
    1. Fluidity (total transit times)
    2. Port Utilization
3. Long-term vision
4. Conclusion

Policy Context

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



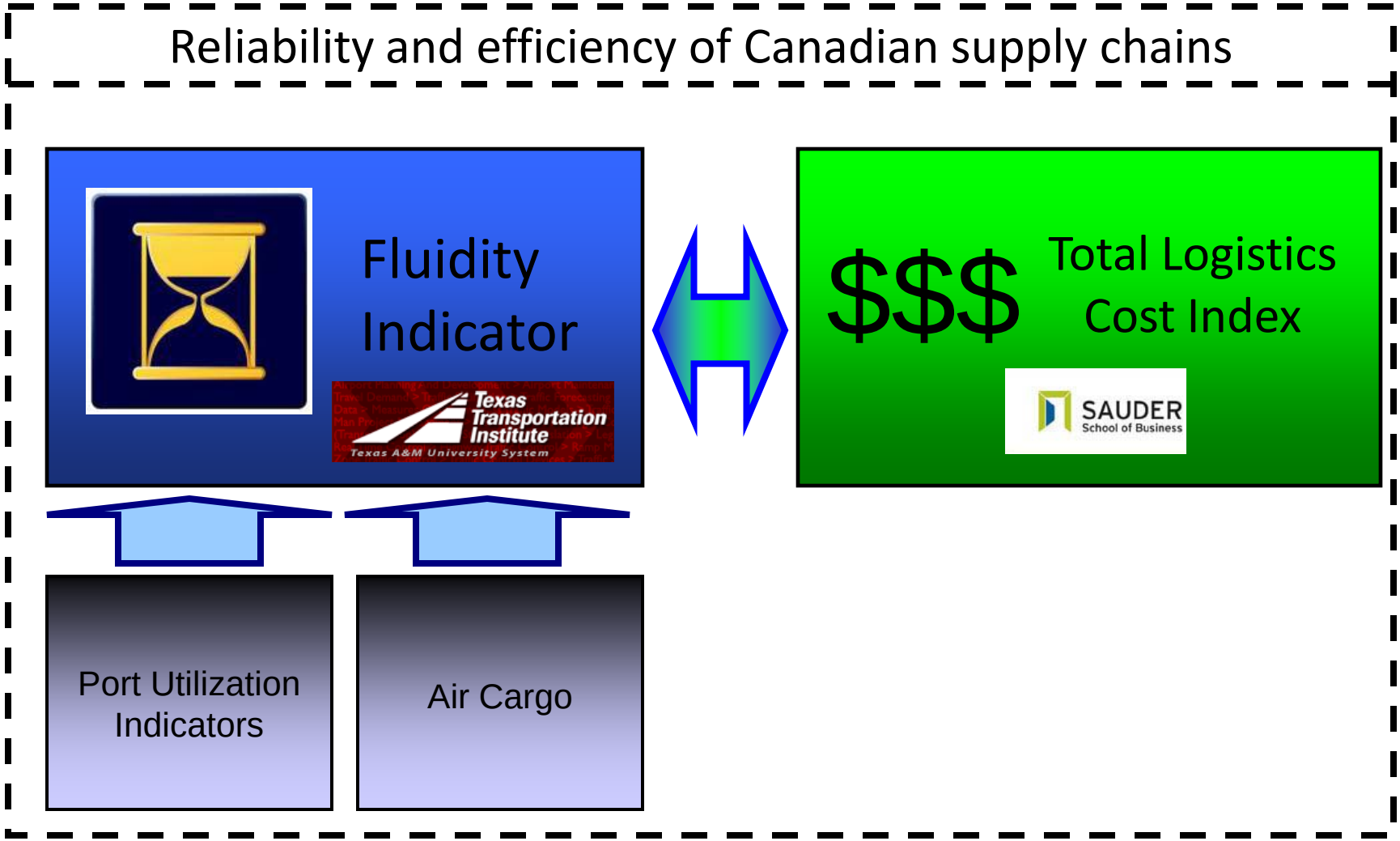
Efficient, reliable and secure gateways to North America

Aligning trade & transportation

Integrated package of investments and policy aimed at enhancing Canada' s competitiveness

System-wide approach

Integrated Research Approach



Fluidity Project

Project Rationale

- **Policy challenge**: providing evidence-based information on reliability and efficiency of Canadian supply chains to support national gateways policy and address common misperceptions on reliability of Canadian system.

- **Objective**: measure total end-to-end transit times for commodities (containers) on strategic origin-destination markets leading to the development of a fluidity indicator.

- Phased approach (start date Feb 2009):
  - **Phase 1**: inbound Asia-Pacific gateway and corridors (rail)
  - **Phase 2**: inbound Asia-Pacific gateway and corridors (trucking)
  - Phase 3: Continental and Atlantic gateways and corridors
  - Phase 4: outbound selected bulk commodities

- Project outcomes:
  - Time series data on transit times on major corridors
  - Sound empirical evidence supporting policy decisions
  - Long-term: ability to benchmark Canadian supply chains at continental scale

Project Methodology

- Partnerships
  - Industry (Airlines, ports, rail and trucking)
  - Texas Transportation Institute
- Data:
  - Ocean: Lloyd's IHS Fairplay, ocean carriers websites and Pacific Gateway Portal
  - Ports: Port Utilization Indicators (i.e. port authorities)
  - Trucking: Trucking fleets and third party suppliers (Turnpike Technology and Shaw Communications)
  - Rail: railroads and third party supplier (GT Nexus)
  - Air: major air cargo carriers

B.C. Ports Import Rail Volume, Number of Containers

	2007	% of Total	2008	% of Total	2009	% of Total
Total	629,344	100%	664,372	100%	580,905	100%
Destination						
Ontario	298,722	47%	292,186	44%	253,813	44%
Quebec	187,131	30%	180,810	27%	156,538	27%
Alberta	60,924	10%	63,211	10%	51,731	9%
Manitoba	13,461	2%	12,099	2%	10,941	2%
Other Canada	9,637	2%	8,801	1%	6,136	1%
Illinois	27,848	4%	47,624	7%	37,199	6%
Other U.S.	31,621	5%	59,641	9%	64,547	11%

Source: Transport Canada

Phase 1 Corridors: Asia-Pacific

CALGARY

- HK-CGY via PR
- HK-CGY via VAN
- SHG-CGY via PR
- SHG-CGY via VAN

TORONTO

- HK-TOR via PR
- HK-TOR via VAN
- SHG-TOR via PR
- SHG-TOR via VAN

MONTREAL

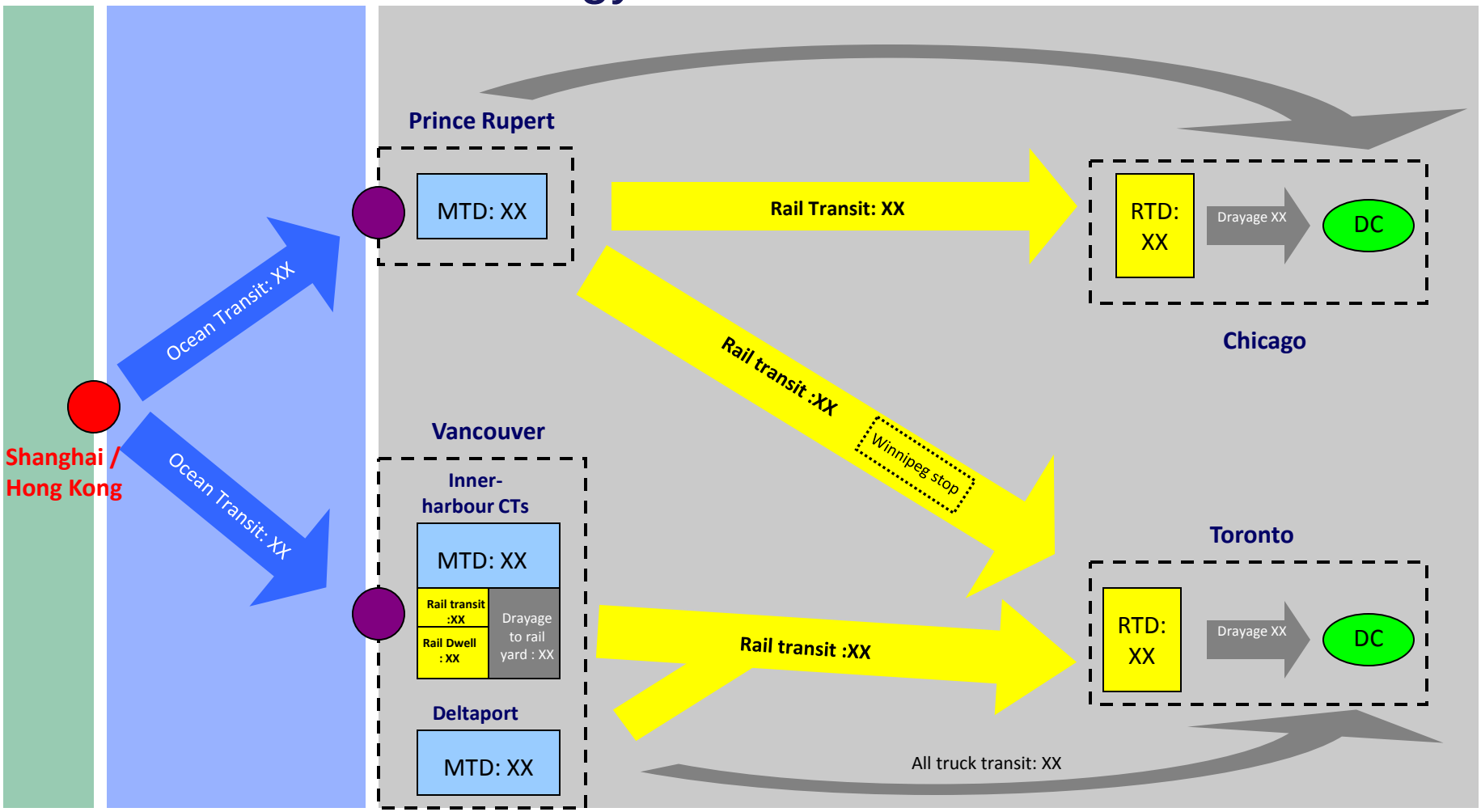
- HK-MTL via PR
- HK-MTL via VAN
- SHG-MTL via PR
- SHG-MTL via VAN

CHICAGO

- HK-CHG via PR
- HK-CHG via VAN
- SHG-CHG via PR
- SHG-CHG via VAN

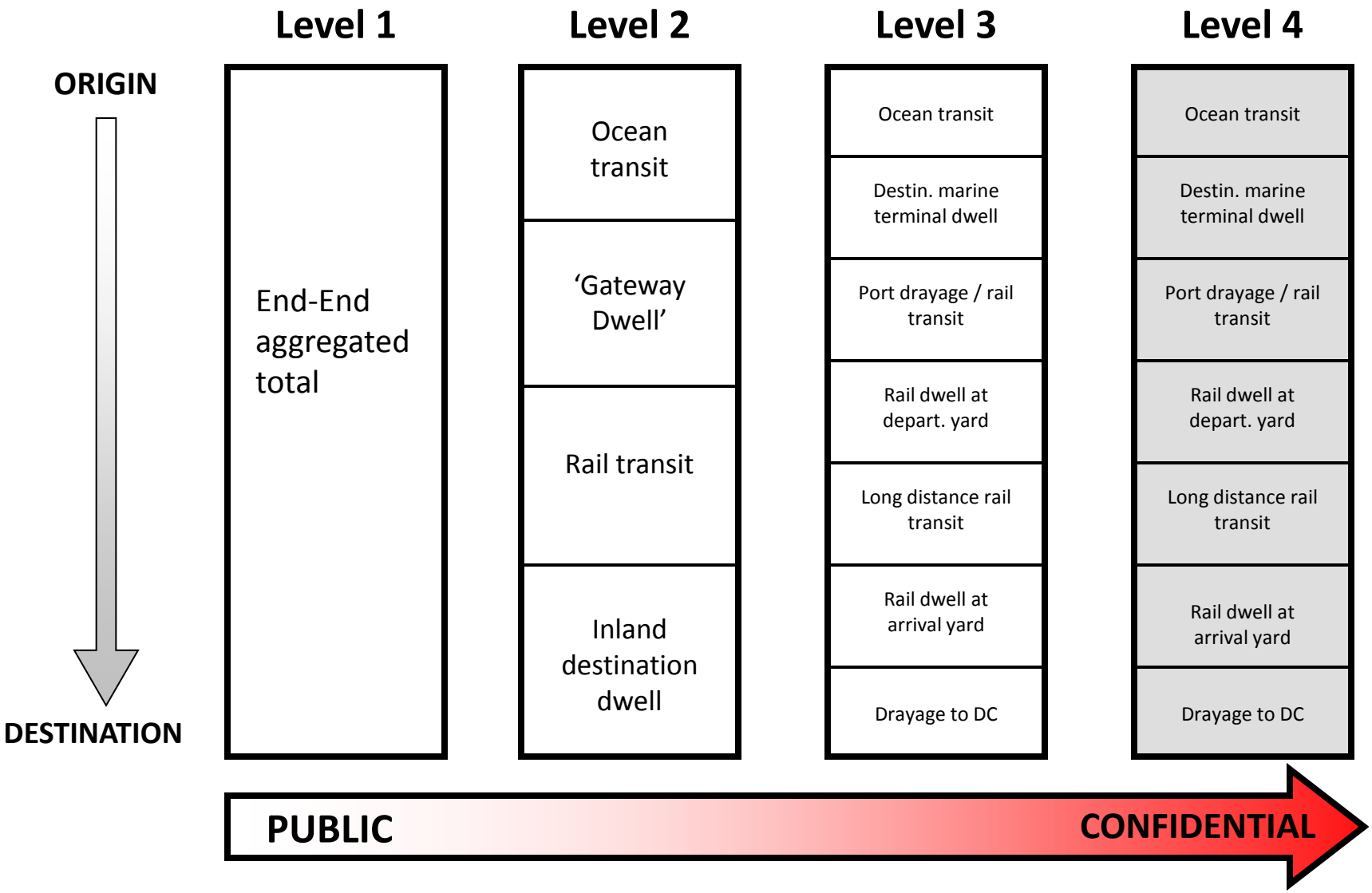
Pacific Gateway Fluidity

Illustrative Methodology



: gateway/ inland hub : marine : rail : trucking MTD: marine terminal dwell RTD: rail terminal dwell

Dissemination Strategy



Pacific Gateway Fluidity

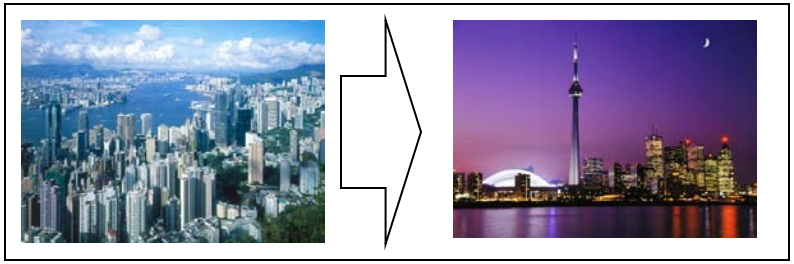
Preliminary Results

Table 1. Total Transit Times for Inbound Containers from Hong Kong to Toronto via B.C. ports, 2009-2010

	Average End-to-End Transit Time (days)	
Month	Vancouver	Prince Rupert
Jan-09	24.9	21.7
Feb-09	23.7	21.5
Mar-09	23.1	22.5
Apr-09	24.6	20.5
May-09	22.4	19.9
Jun-09	22.3	20.9
Jul-09	22.2	20.6
Aug-09	21.0	19.6
Sep-09	21.8	21.8
Oct-09	22.7	20.2
Nov-09	21.8	19.9
Dec-09	22.7	23.4
2009 Average	**22.8**	**21.0**
Jan-10	23.9	21.2
Feb-10	23.6	21.4
Mar-10	22.6	21.2
2010 Average	**23.4**	**21.3**
15-Month Average	**22.9**	**21.1**

Table 2. Total Transit Times for Inbound Containers from Shanghai to Toronto via B.C. ports, 2009-2010

	Average End-to-End Transit Time (days)	
Month	Vancouver	Prince Rupert
Jan-09	24.2	19.7
Feb-09	23.3	18.7
Mar-09	23.0	19.9
Apr-09	22.7	16.9
May-09	21.6	16.1
Jun-09	21.9	17.6
Jul-09	23.1	16.8
Aug-09	21.3	16.2
Sep-09	22.7	18.6
Oct-09	22.7	16.7
Nov-09	23.7	17.2
Dec-09	23.5	20.2
2009 Average	**22.8**	**17.9**
Jan-10	24.1	19.1
Feb-10	26.5	20.0
Mar-10	23.9	17.7
2010 Average	**24.8**	**18.9**
15-Month Average	**23.2**	**18.1**



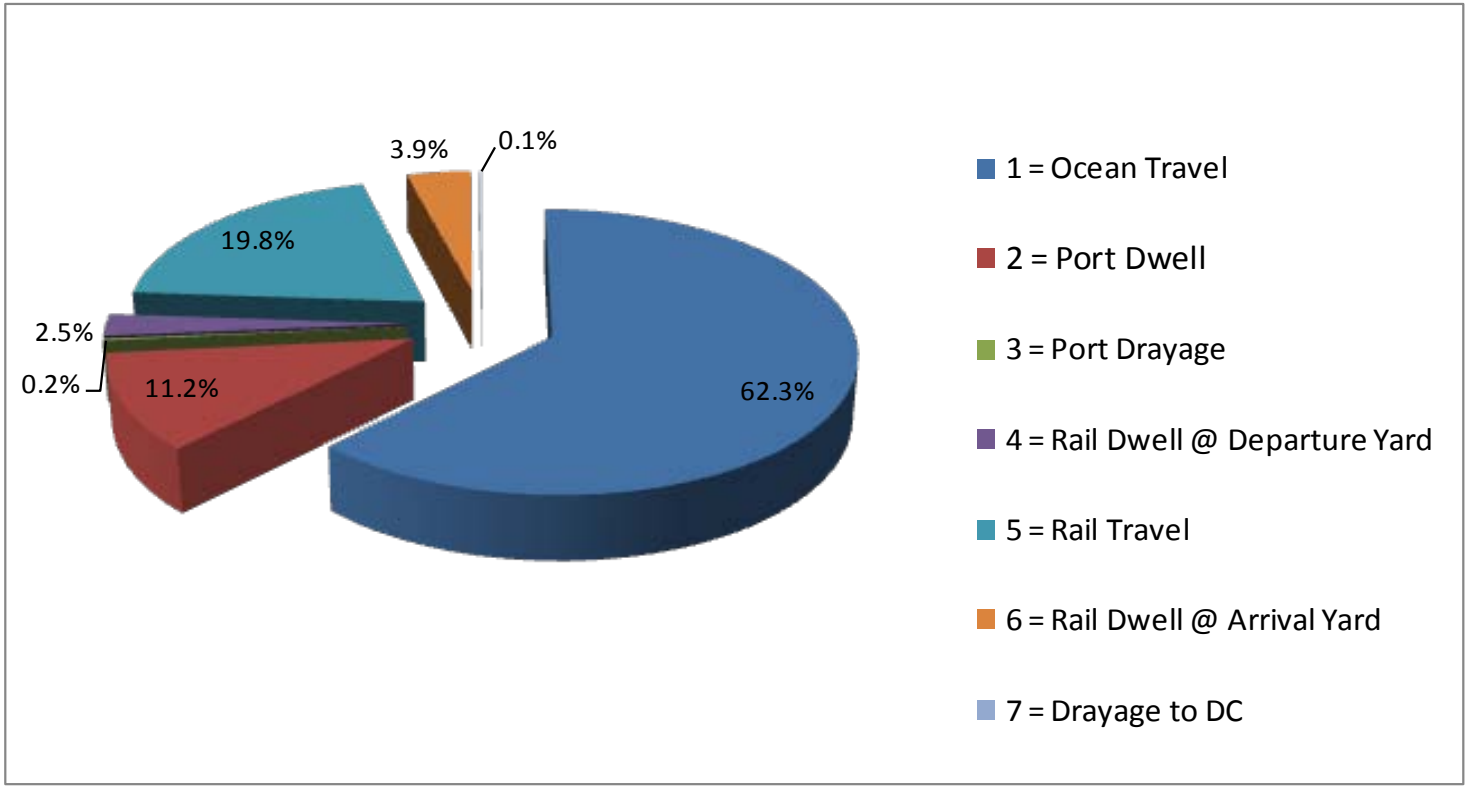
Segment Analysis Template

Hong Kong									
Toronto									
Port Metro Vancouver									
A - (Hrs)	B - (Hrs)	C - (Hrs)	D - (Hrs)	E - (Hrs)	F - (Hrs)	G - (Hrs)	H - (Hrs)	I - (Days)	J

Prince Rupert									
A - (Hrs)	B - (Hrs)	C - (Hrs)	D - (Hrs)	E - (Hrs)	F - (Hrs)	G - (Hrs)	H - (Hrs)	I - (Days)	J

A = Origin Port Dwell
B = Ocean Travel
C = Destination Port Dwell
D = Port Drayage
E = Rail Dwell @ Departure Yard
F = Rail Travel
G = Rail Dwell @ Arrival Yard
H = Drayage to DC
I = Total (In Days)
J = Fluidity Index Indicator

Breakdown by Segment
2009 Pacific Gateway Fluidity



Next Phase - Road Movements

Port Utilization Indicators

Project Rationale

- **Policy challenge**: providing evidence-based information on reliability and efficiency of Canadian supply chains to support national gateways policy and address common misperceptions on reliability of Canadian system.

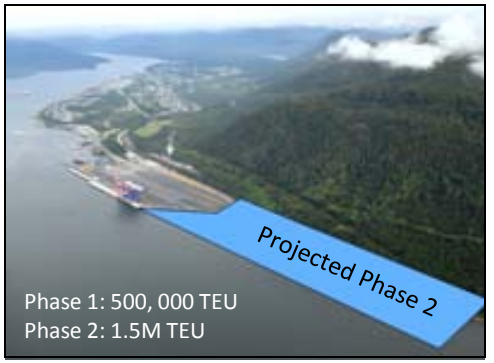
- **Objective**: assist Canadian ports to monitor port utilization and performance over time.

- Phased approach (start date Nov 2008):
  - Phase 1: Intermodal indicators
  - Phase 2: bulk indicators
  - Phase 3: Harmonization and benchmarking

- Project outcomes:
  - Time series data on port utilization and performance
  - Metrics to feed fluidity project (e.g. dwell time)
  - Long-term: ability to benchmark Canadian ports internationally

North American West Coast Container Ports 2009

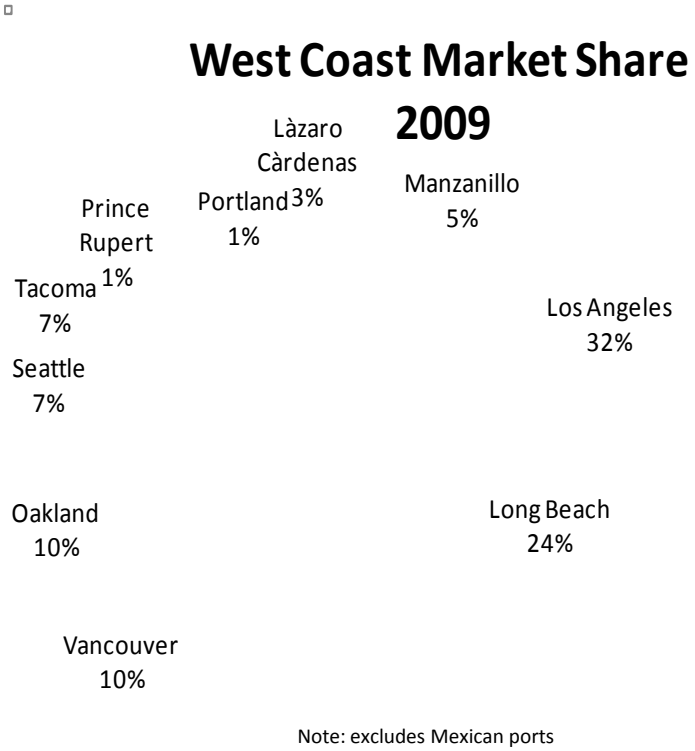
Port Metro Vancouver



Port of Prince Rupert

Rank	Country	Port	TEUs 2009	% growth over 2008
1		Los Angeles	6,748,995	-14%
2		Long Beach	5,067,597	-22%
3		Vancouver	2,152,461	-14%
4		Oakland	2,045,211	-8%
5		Seattle	1,584,596	-7%
6		Tacoma	1,545,855	-17%
7		Manzanillo	1,110,350	-21.2%
8		Làzaro Càrdenas	585,449	11.6%
9		Prince Rupert	265,224	46%
10		Portland	174,203	-29%

Source: port authorities



Note: excludes Mexican ports

Port Utilization Indicators

Intermodal Indicators (4 ports reporting):

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	[Min.]
6.	Average Container Dwell Time (Rail)	[Hr]
7.	Gross Port Productivity	[TEU/Gross Ha]
8.	Crane Productivity	[TEU/STS crane]

Bulk Indicators (6 ports reporting):

9.	Berth Occupancy Rate	[%]
10.	Gross Berth Productivity	[Tonnes / berth-hr]
11.	Average Vessel Turnaround Time	[Hours]

Port Utilization Indicators for British Columbia Container Ports 2009

	Indicator	Jan 09	Feb 09	Mar 09	Apr 09	May 09	Jun 09	Jul 09	Aug 09	Sept 09	Oct 09	Nov 09	Dec 09	AVG 09
1	Gate Fluidity - **Minutes**[1]	N/A	N/A	12.8	13.8	13.5	12.4	12.2	17.0	N/A	11.1	11.8	11.1	12.9
2	Avg. Truck Turnaround Time - **Minutes**	N/A	21.9	22.1	22.3	20.4	21.0	20.1	19.4	22.1	19.7	23.5	22.6	21.4
3	Berth Utilization - **TEU/Meter**	61.1	53.4	66.0	65.8	70.5	67.1	71.2	71.4	71.3	69.9	70.1	70.8	67.4
4	Vessel Turnaround Time (1) - **Seconds/TEU**[2]	51	46	45	42	40	41	36	34	41	37	39	36	41
5	Vessel Turnaround Time (2) - **Hours/Vessel Call**[2]	N/A	31.7	33.2	30.0	30.9	33.4	31.6	31.5	36.8	35.3	36.4	36.6	33.4
6	Avg. Container Dwell - **Days**[3]	3.2	2.7	2.3	3.0	1.8	2.5	2.8	2.0	2.5	2.5	2.3	2.9	2.5
7	Port Productivity - **TEU/gross ha**	1,286	1,119	1,386	1,375	1,470	1,396	1,465	1,487	1,450	1,432	1,438	1,431	1,395
8	Crane Productivity - **TEU/STS crane**	6,757	5,909	7,292	7,290	7,809	7,435	7,908	7,953	7,945	7,876	7,800	7,887	7,488
	Container Throughput - **TEU**	179,742	158,305	194,455	195,935	210,095	200,331	213,455	218,717	218,570	211,032	210,010	211,743	201,866

TOTAL TEU 2009 = 2,422,390

Notes:

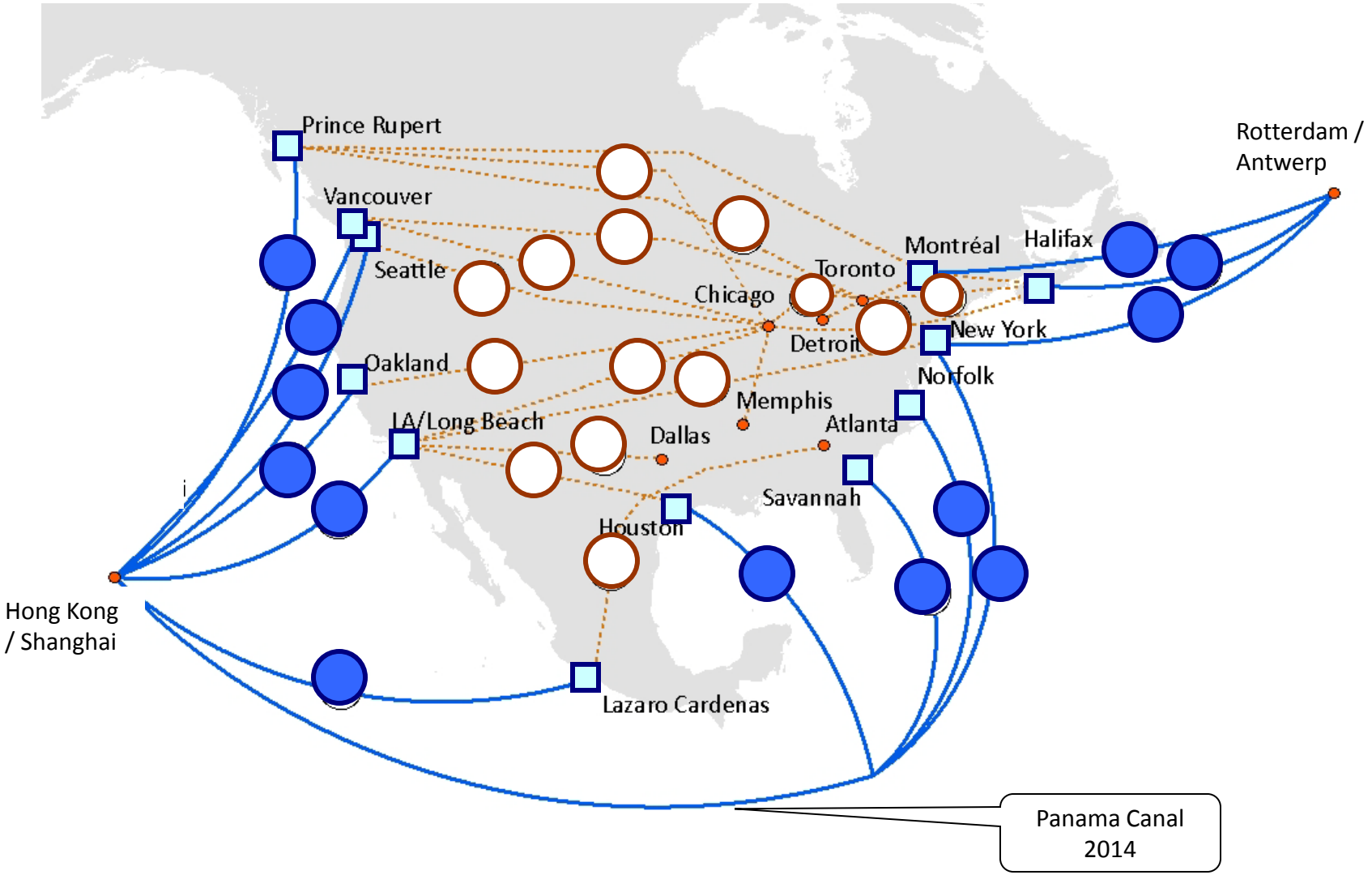
All figures are weighted averages of the two B.C. ports. They represent the 5 container terminals in Vancouver and Prince Rupert.
TEU: twenty-foot equivalent unit, a standard measurement of container activity.

1: A measure of truck wait times at terminal gates. Year 2009 is pilot data based on 15 truck sample and primary gate waiting areas (excluding all staging areas). 2010 data to include staging areas
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*. Note that dwell time calculation differs at the two ports. In Vancouver, dwell time is from the time a vessel docks to the time containers are ramped up on rail car, while in Prince Rupert dwell time begins when the container is offloaded the vessel and lands on the dock to the time it is ramped to rail car.

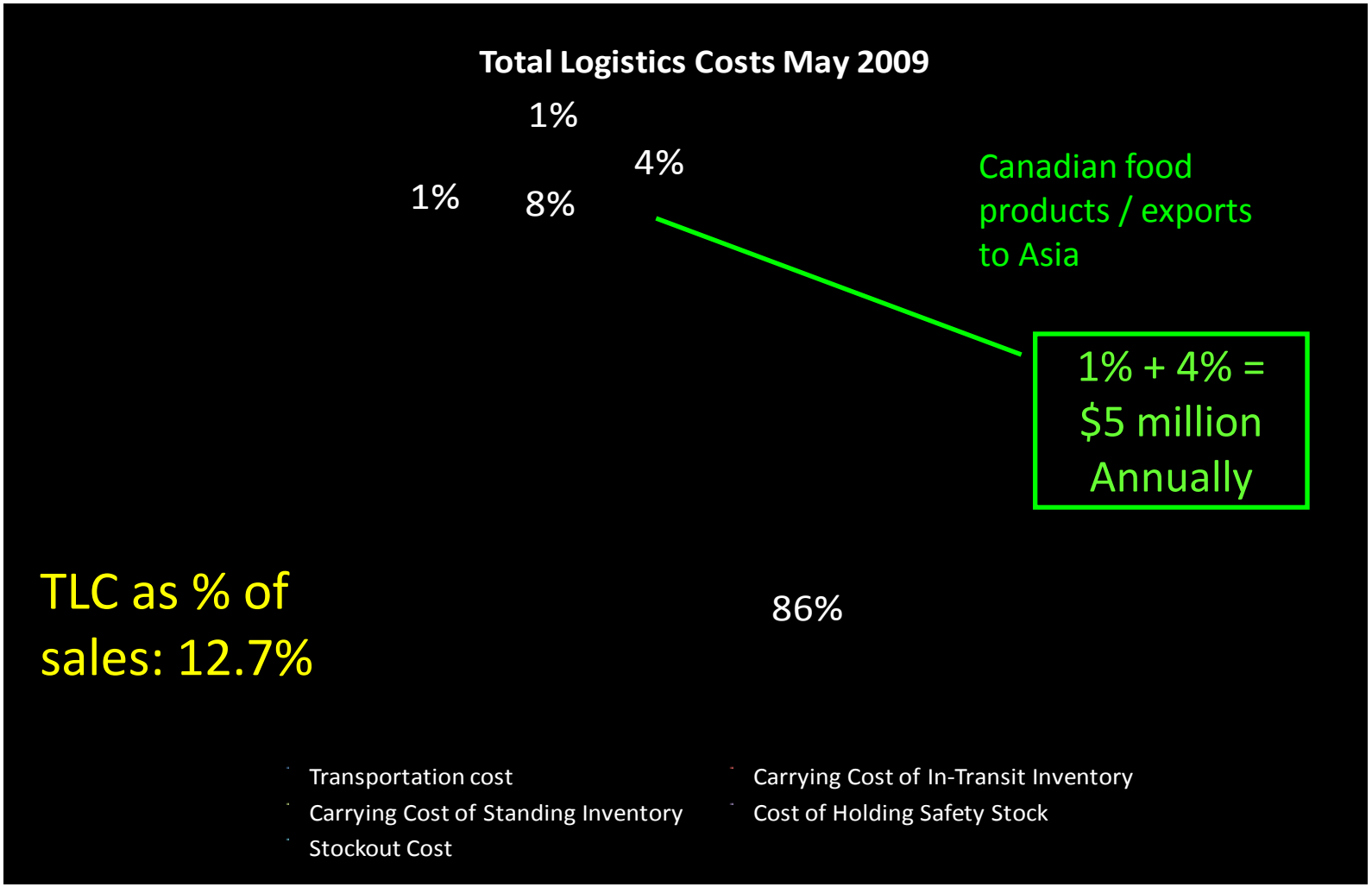
Long-Term Targeted Output

Long-Term Targeted Output

Gateways and Trade Corridors Approach



Total Logistics Costs: Preliminary Output



Conclusion

- Benefits of having clear metrics:
  - Support policy of Gateways (e.g. identify bottlenecks)
  - Address (perception of) reliability issue with objective facts
  - Benchmark performance of Canadian supply chains
  - Measure return on investment
  - Marketing value
- Challenges:
  - Arrive at common definitions e.g. dwell
  - Data intensiveness on the trucking side
  - Voluntary approach / multiple partnerships
  - Address air cargo fluidity/connectivity
  - Obtain data on U.S. trade lanes e.g. U.S. dwell times at the ports
  - Establishing costing approach (TLC versus Logistics costs)
- Risks
  - Voluntary participation
  - Some of the data are proprietary

THANK YOU

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