TransLink: A multi-modal, integrated transport and operations system

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Is the Grass Greener?
Transportation Planning and Policy in Metro Vancouver

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A shared vision (1975)
Mayors’ Council Vision (2014)
50% of Trips by Walking, Cycling, Transit

The region as a whole is at 27%

Today
- 1.6 M trips: 27%
- 4.4 M trips: 73%

In 30 years
- 4.4 M trips: 50%

Target 50%
Distance Driven Reduced By 33%

VKT per Capita ↓10.8%
Benefits of headline targets
Most Important Local Issues

affordability

transit

housing

transportation
Approves changes to fares, taxes, and strategic plans

Approves budgets, policies and directs management

Plans, finances, markets and communicates

Delivers services
Sources and uses of funds

2014 Revenue
(S thousands)
$1,453.8

- Transit / 34% / $495,609
- Fuel Tax / 24% / $340,104
- Property and Replacement Tax / 22% / $324,510
- Gov't Transfers, Interest, Amortization / 10% / $148,303
- Parking Rights Tax / 4% / $59,971
- Other (includes Aircare) / 3% / $43,632
- Golden Ears Bridge Tolls / 3% / $41,623

2014 Expenditures
(S thousands)
$1,426.9

- Transit Operations / 62% / $888,793
- Interest Expense / 12% / $171,094
- Amortization of Capital Assets / 11% / $161,472
- Roads & Bridges / 6% / $83,627
- Corporate / 5% / $71,752
- Transit Police / 3% / $34,334
- Aircare / 1% / $15,806
Fuel Levy Forecast
Revenues

17 cents per liter fuel tax
(49 cents per gallon USD)
$1,453.8

$324M annual revenue (24%)
A brief history of Metro Vancouver fuel sales…

Revenue at current tax rates (millions)

Litres of gasoline & diesel sold (millions)

85% gasoline
15% diesel

Refund adjustments from carbon tax
What’s driving fuel sales?

Direct Factors

- Vehicle Ownership (+)
- Fuel Efficiency (-)
- VKT/Vehicle (+)
- Sales Leakage (-)

Indirect Factors

- Demographics
- Transit Service
- Prices for Transportation Modes
- US/Canada Exchange Rate
- Income
- Other Factors
Research by...

F. King and J. Fox

Revenue and Policy Implications from Emerging Fuel Sale Trends in Metro Vancouver, BC, Canada
Transportation Research Record, No 2530, 2015
Average vehicle in Metro Vancouver isn’t as fuel efficient as we thought…

2001

-4%

-5%

30% 40%

2013

+3%

-5%

68% 56%

chart showing the percentage of light trucks and cars in 2001 and 2013
Hybrid vehicle market penetration is still relatively low...

Registered Vehicles

- All Hybrids: 2%
- Gasoline: 92%
- Diesel: 6%
- Other: 0%
So what?

- Fuel efficiency was not a major factor contributing to the 2009-2013 drop in fuel tax revenue.
Total VKT from vehicles registered in Metro Vancouver stopped growing for 2008-2013

Total VKT = Vehicle Ownership (+) * VKT/Vehicle (+)
VKT per vehicle and per capita

VKT per Vehicle

VKT per Capita

↓8.5%

↓10.8%
Total 10-year Change in VKT (2003 to 2013)

- Change in average VKT per capita
- Change in average VKT per vehicle

-15% Burnaby & New Westminster
-14% Langley
-9% North Shore
-9% Northeast
-11% Pitt Meadows & Maple Ridge
-6% Richmond & South Delta
-4% South of Fraser
-4% Vancouver
Decoupling of road usage & fuel sales

![Graph showing decoupling of road usage and fuel sales over time. The graph plots total VKT (Billions km) and retail gasoline sale volumes (Billions L) from 2000 to 2014. The total VKT line shows an overall increase, while the retail gasoline sale volumes line shows a decline from 2004 to 2014.]
We should get gas...
The North Shore

40 min to Squamish

60 min to USA

45 min to Aldergrove
Total VKT + fuel efficiency explains fuel sales in North Shore, but not in other sub-regions.

North Shore

South of Fraser, Langley, Pitt Meadow, and Maple Ridge
Canadian vehicle crossings into Washington State doubled 2010 to 2014

CAD/USD exchange rate

CDN vehicles returning from Washington

Number of Canadian vehicles returning from Washington State per Month
Strong negative correlation between total fuel sales and border crossings

Metro Vancouver fuel sales (MA)

CDN vehicles returning from Wash. (MA)
Conclusions for fuel sales

- Vehicle fuel efficiency gains have been small because of a switch from cars to light trucks
- Fuel sales and road usage (VKT) have decoupled
- Unable to explain fuel sales trends without considering the USD/CAD exchange rate and border crossings into the USA
### Results of regression analysis

<table>
<thead>
<tr>
<th>Variable</th>
<th>Description</th>
<th>Effect on VKT per vehicle</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gas Price</td>
<td>Real price of gas in previous quarter</td>
<td>+10% → -0.12%</td>
</tr>
<tr>
<td>Transit Service</td>
<td>Square root of transit service hours</td>
<td>Double service → -8.7%</td>
</tr>
<tr>
<td>Median Income</td>
<td>Real median income for region</td>
<td>+10% → +2%</td>
</tr>
<tr>
<td>Vehicle Age</td>
<td>Change in vehicle age</td>
<td>+10% → -2.4%</td>
</tr>
<tr>
<td>Proximity to CBD</td>
<td>Distance of owner to central business district (m)</td>
<td>+10% → 0.11%</td>
</tr>
<tr>
<td>Proximity to regional town centre</td>
<td>Distance of owner to regional town centre</td>
<td>+10% → 0.04%</td>
</tr>
<tr>
<td>Auto Accessibility</td>
<td>Auto access score for each TAZ (generated by EMME)</td>
<td>+10% → -0.16%</td>
</tr>
<tr>
<td>Transit Accessibility</td>
<td>Transit access score for each TAZ (generated by EMME)</td>
<td>+10% → -0.28%</td>
</tr>
<tr>
<td>Jobs-Housing Balance</td>
<td>Jobs to population ratio in each TAZ</td>
<td>+0.1 → -0.01%</td>
</tr>
<tr>
<td>Constant</td>
<td>Vancouver subregion constant</td>
<td>6,310 km</td>
</tr>
</tbody>
</table>
Pattullo Bridge Replacement Project
Pattullo Bridge
Project Need

- Seismic Vulnerability
- Scour
- Deck Condition
- Ship Impact
Project Need

Road Geometry

Pattullo Bridge

Sidewalk

NORTHBOUND

↓  ↓

0.20m

3.04m

2.895m

2.895m

3.04m

SOUTHBOUND

↑  ↑

12.07m
Replacement Design Challenges

Downtown Surrey

Proximity to existing structures

Downtown New Westminster

Fraser River: habitat & archaeology
Strategic Review 2011-14

Pattullo Bridge Review Consultation
February - March 2014

Discussion Guide and Feedback Form
February 24 - March 14, 2014

Please submit your feedback by March 14, 2014
Forecast effect of adding a $3 toll to 4-lane Pattullo

- About 10% stays on the North side
- About 10% switches to Alex Fraser Bridge
- About 50% stays on Pattullo Bridge
- About 20% switches to Port Mann Bridge
- About 15% stays on the South side
Richmond City Council has advised TransLink that it is opposed to the consideration of a new P over river crossing in the vicinity of Tree Island as part of any alternative to replace or upgrade the Pattullo Bridge, as this alternative is not in the City’s Official Community Plan and it could have a significant impact on the land use in the area.
## Multiple Account Analysis

### Shortlisted Options

<table>
<thead>
<tr>
<th>OBJECTIVES</th>
<th>1. REHABILITATED 3-LANE PATTULLO BRIDGE</th>
<th>2. REHABILITATED 4-LANE PATTULLO BRIDGE</th>
<th>3. NEW 4-LANE PATTULLO BRIDGE</th>
<th>4. NEW 5-LANE PATTULLO BRIDGE</th>
<th>5. NEW 6-LANE PATTULLO BRIDGE</th>
<th>6. NEW 4-LANE SURREY-COQUITLAM BRIDGE WITH A REHABILITATED 3-LANE PATTULLO BRIDGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Moves towards the regional goal that most trips will be by walking, cycling and transit.</td>
<td><img src="green.png" alt="Favourable" /></td>
<td><img src="green.png" alt="Favourable" /></td>
<td><img src="neutral.png" alt="Neutral" /></td>
<td><img src="green.png" alt="Favourable" /></td>
<td><img src="green.png" alt="Favourable" /></td>
<td><img src="green.png" alt="Favourable" /></td>
</tr>
<tr>
<td>2. Minimizes single-occupant vehicle use and vehicle kilometres travelled.</td>
<td><img src="green.png" alt="Favourable" /></td>
<td><img src="green.png" alt="Favourable" /></td>
<td><img src="neutral.png" alt="Neutral" /></td>
<td><img src="green.png" alt="Favourable" /></td>
<td><img src="green.png" alt="Favourable" /></td>
<td><img src="green.png" alt="Favourable" /></td>
</tr>
<tr>
<td>3a. Minimizes emissions of greenhouse gases (GHGs) and pollutants.</td>
<td><img src="green.png" alt="Favourable" /></td>
<td><img src="green.png" alt="Favourable" /></td>
<td><img src="neutral.png" alt="Neutral" /></td>
<td><img src="green.png" alt="Favourable" /></td>
<td><img src="green.png" alt="Favourable" /></td>
<td><img src="green.png" alt="Favourable" /></td>
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<tr>
<td>3b. Minimizes impact to the natural environment.</td>
<td><img src="green.png" alt="Favourable" /></td>
<td><img src="green.png" alt="Favourable" /></td>
<td><img src="neutral.png" alt="Neutral" /></td>
<td><img src="green.png" alt="Favourable" /></td>
<td><img src="green.png" alt="Favourable" /></td>
<td><img src="green.png" alt="Favourable" /></td>
</tr>
<tr>
<td>4. Is capable of supporting neighbourhood livability by minimizing and mitigating impacts, including during construction, and provides an aesthetically pleasing structure.</td>
<td><img src="green.png" alt="Favourable" /></td>
<td><img src="green.png" alt="Favourable" /></td>
<td><img src="neutral.png" alt="Neutral" /></td>
<td><img src="green.png" alt="Favourable" /></td>
<td><img src="green.png" alt="Favourable" /></td>
<td><img src="green.png" alt="Favourable" /></td>
</tr>
<tr>
<td>5. Supports local and regional land use plans.</td>
<td><img src="green.png" alt="Favourable" /></td>
<td><img src="green.png" alt="Favourable" /></td>
<td><img src="neutral.png" alt="Neutral" /></td>
<td><img src="green.png" alt="Favourable" /></td>
<td><img src="green.png" alt="Favourable" /></td>
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<tr>
<td>6. Supports economic development.</td>
<td><img src="green.png" alt="Favourable" /></td>
<td><img src="green.png" alt="Favourable" /></td>
<td><img src="neutral.png" alt="Neutral" /></td>
<td><img src="green.png" alt="Favourable" /></td>
<td><img src="green.png" alt="Favourable" /></td>
<td><img src="green.png" alt="Favourable" /></td>
</tr>
<tr>
<td>7. Provides reliable access and predictable travel times for all modes and users.</td>
<td><img src="green.png" alt="Favourable" /></td>
<td><img src="green.png" alt="Favourable" /></td>
<td><img src="neutral.png" alt="Neutral" /></td>
<td><img src="green.png" alt="Favourable" /></td>
<td><img src="green.png" alt="Favourable" /></td>
<td><img src="green.png" alt="Favourable" /></td>
</tr>
<tr>
<td>8. Provides a safer crossing for all modes, is structurally sound, and meets current standards for seismic and ship impacts.</td>
<td><img src="green.png" alt="Favourable" /></td>
<td><img src="green.png" alt="Favourable" /></td>
<td><img src="neutral.png" alt="Neutral" /></td>
<td><img src="green.png" alt="Favourable" /></td>
<td><img src="green.png" alt="Favourable" /></td>
<td><img src="green.png" alt="Favourable" /></td>
</tr>
<tr>
<td>9. Is cost-effective.</td>
<td><img src="green.png" alt="Favourable" /></td>
<td><img src="green.png" alt="Favourable" /></td>
<td><img src="neutral.png" alt="Neutral" /></td>
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</tr>
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</table>

**Main span, approaches, replacement of existing connections, tolling system.** Also includes removal of existing bridge and/or installation of counter-flow system where appropriate. Committed costs of near-term seismic and structural work ($400 million) is subtracted if the existing bridge is retained.

- **Additional and enhanced connections and other network modifications identified for further consideration:** $0M
- **Capital cost of configuration used in the evaluation:** $250M

<table>
<thead>
<tr>
<th>1. REHABILITATED 3-LANE PATTULLO BRIDGE</th>
<th>$250M</th>
<th>$250M</th>
<th>$750M</th>
<th>$850M</th>
<th>$900M</th>
<th>$1,500M</th>
</tr>
</thead>
<tbody>
<tr>
<td>2. REHABILITATED 4-LANE PATTULLO BRIDGE</td>
<td>$250M</td>
<td>$250M</td>
<td>$850M</td>
<td>$1,450M</td>
<td>$1,500M</td>
<td>$1,750M</td>
</tr>
<tr>
<td>3. NEW 4-LANE PATTULLO BRIDGE</td>
<td>$750M</td>
<td>$500M–$1,750M</td>
<td>$500M–$600M</td>
<td>$500M–$600M</td>
<td>$250M</td>
<td></td>
</tr>
<tr>
<td>4. NEW 5-LANE PATTULLO BRIDGE</td>
<td>$850M</td>
<td>$500M–$600M</td>
<td>$500M–$600M</td>
<td>$250M</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. NEW 6-LANE PATTULLO BRIDGE</td>
<td>$900M</td>
<td>$500M–$600M</td>
<td>$250M</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. NEW 4-LANE SURREY-COQUITLAM BRIDGE WITH A REHABILITATED 3-LANE PATTULLO BRIDGE</td>
<td>$1,500M</td>
<td>$250M</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- **Not recommended for further analysis**
- **New Westminster requests that this alternative receive further consideration**
- **Requires further consideration**
- **Not recommended for further analysis**
- **Requires further consideration**
- **New Westminster requests that this alternative receive further consideration**
### Traffic Volumes on the 6 shortlisted tolled options

<table>
<thead>
<tr>
<th>Estimated Weekday Volumes</th>
<th>Opening Day (if in place today)</th>
<th>2045</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Rehabilitated 3-lane Pattullo Bridge</td>
<td>44,500</td>
<td>71,000</td>
</tr>
<tr>
<td>2. Rehabilitated 4-lane Pattullo Bridge</td>
<td>44,500</td>
<td>72,500</td>
</tr>
<tr>
<td>3. New 4-lane Pattullo Bridge</td>
<td>49,000</td>
<td>78,500</td>
</tr>
<tr>
<td>4. New 5-lane Pattullo Bridge</td>
<td>51,500</td>
<td>85,500</td>
</tr>
<tr>
<td>5. New 6-lane Pattullo Bridge</td>
<td>52,000</td>
<td>86,500</td>
</tr>
<tr>
<td>6. New 4-lane Surrey-Coquitlam Bridge</td>
<td>34,000</td>
<td>47,500</td>
</tr>
<tr>
<td>Rehabilitated 3-lane Pattullo Bridge</td>
<td>28,000</td>
<td>55,000</td>
</tr>
</tbody>
</table>

*Average daily volume today is 80,000 vehicles.*
• Two options best meet project objectives:
  – New 4-lane bridge in the existing corridor
  – New 6-lane bridge in the existing corridor

• Trade-offs in bridge capacity:
  – Support for mode share and VKT goals
  – Support for economic development
  – Support for travel time reliability
  – Cost effectiveness
Mayors’ Council Vision (2014)
Adaptable Bridge Concept

Four-lane bridge with two-way pedestrian and cyclist facilities separated from traffic on both sides of the bridge.

Potential future conversion to a six-lane bridge; multi-use paths could be added on either side of the bridge for pedestrians and cyclists.
Pattullo Replacement Reference Concept
4-Lane Adaptable Bridge
Your thoughts...