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Monetizing Some Benefits of Participation in NEXUS

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About NEXUS

NEXUS is a ‘trusted traveler’ program that provides expedited processing when entering the U.S. and Canada. Below are program details:

- Applicants pay a \$50 fee and are interviewed and vetted by both Canadian and U.S. security agencies.
- Cards are valid for 5 years.
- Cardholders use separate lanes that bypass the queue of standard travelers.
- NEXUS cards are scanned prior to reaching the booth, decreasing processing time.
- The at-booth inspection is rapid, because NEXUS travelers are “trusted.”
- Throughput of a NEXUS booth is more than twice that of a standard booth because of the simplified and accelerated process.

NEXUS is heavily utilized at the Peace Arch/Douglas crossing, which is the busiest northern border crossing for personal vehicles:

- 46% of all Peace Arch/Douglas traffic is NEXUS traffic.²
- 40% of all NEXUS members reside in WA or B.C.³

Introduction. There are many benefits of the NEXUS program, ranging from personal time savings to improved security. While monetizing those benefits is challenging, it is important to assess the value of NEXUS and provide information that can support further expansion of the program. This *Border Brief* quantifies certain individual economic benefits of membership in the NEXUS program using data from 2012 to 2014. We focus on the Peace Arch/Douglas crossing, where the traffic volume is high and a large percentage of travelers are enrolled in NEXUS (*see sidebar*).

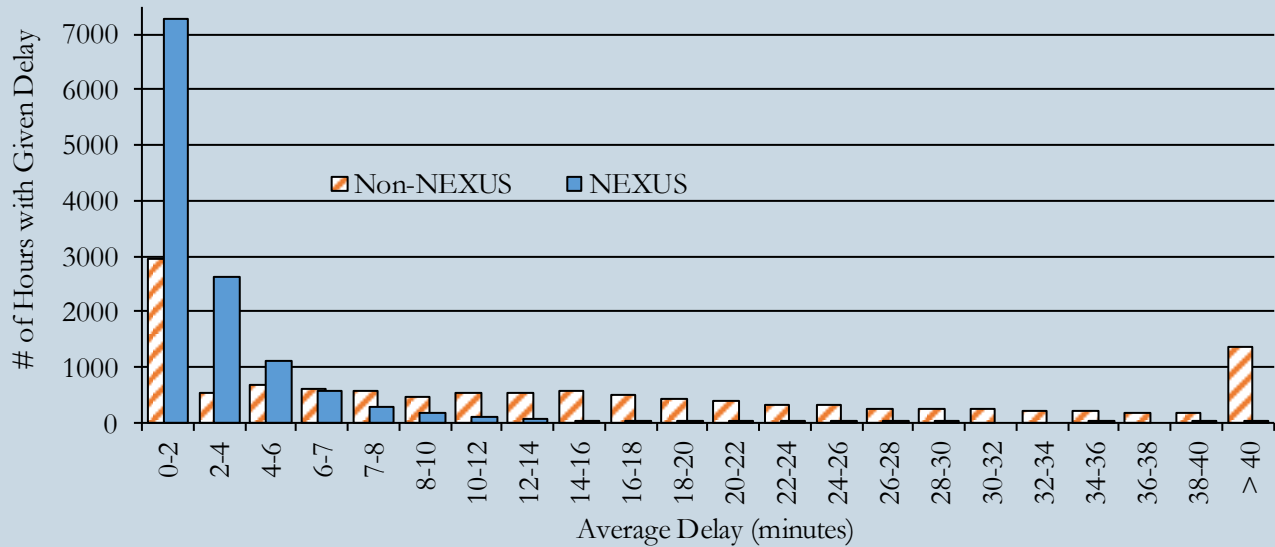
Background. Many residents of Whatcom County, Washington, and the Lower Mainland of B.C. cross the U.S. – Canada border regularly. Whatcom County residents typically cross north for recreational and vacation opportunities, while residents of the Lower Mainland travel south to take advantage of greater retail variety and lower prices.⁴ Nearly three-quarters of this cross-border traffic occurs through the two border crossings in Blaine: Peace Arch and Pacific Highway.⁵ With over 10,000 personal vehicles per day using just two crossings, border delays in Blaine are some of the longest on the northern border. Delays at Peace Arch in particular can be lengthy and variable.

Measuring Delays. To compare the delays experienced by both NEXUS and non-NEXUS travelers, we relied on a wait-time measurement system in place at Peace Arch.⁶ We analyzed archived data for the 24-month period from November 2012 through October 2014, using only northbound data.⁷ We computed the average delay encountered by both NEXUS traffic and non-NEXUS traffic for each distinct hour in the study period, yielding 12,000+ hourly values. Table 1 shows the overall average delay (i.e., the average of the 12,000+ hourly values) encountered by each kind of traffic. The delays experienced by NEXUS travelers at Peace Arch are significantly lower than those experienced by non-NEXUS travelers—1.3 minutes for NEXUS, versus 16.4 minutes for non-NEXUS.

Table 1. Average Delay in Minutes

	Mon-Sun	Sat-Sun
NEXUS	1.3	1.9
Non-NEXUS	16.4	21.7

Figure 1. Frequency of Occurrence of a Given Delay for NEXUS vs. Non-NEXUS

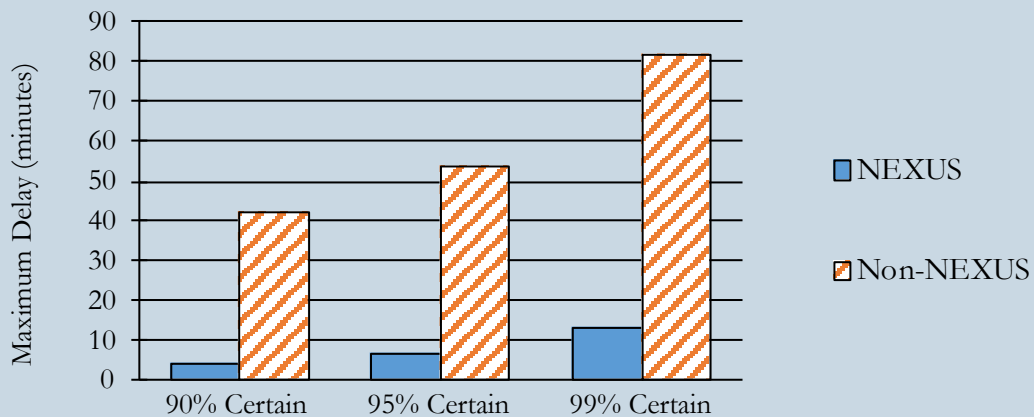


Because there is significantly more cross-border traffic on the weekends, Table 1 also displays the impact that higher weekend volumes have on traffic delays. Though wait times increased regardless of lane type, the average delay experienced by NEXUS travelers remained negligible. The reduction in delay provided to NEXUS travelers is substantial and *valuable*.

Increased Predictability. While overall average delays give an indication of the relative difference between the time it takes to cross the border for NEXUS versus non-NEXUS travelers, such numbers do not reveal the *variation* in delays, which fluctuates considerably over the course of the day for non-NEXUS travelers. Figure 1 displays this variation by graphing how often certain delays occur at Peace Arch/Douglas. Each number on the horizontal axis represents a two-minute range, and the height of a bar corresponds to how many of the 12,000+ hourly averages fell within each range. NEXUS delays rarely exceeded ten minutes, with the hourly averages predominantly within the 0-2 minute range.⁸ Delays for non-NEXUS travelers are much more erratic, with most being less than 20 minutes, but with a substantial cluster in excess of 40 minutes.

For most cross-border travelers, the costs of *late* arrival are much higher than the costs of *early* arrival. Missing the first inning of a Mariners game is a less desirable circumstance than being forced to spend an extra pre-game hour in Seattle. To prepare for unpredictable fluctuations in wait-times, travelers often 'buffer' their travel time, leaving early enough to ensure that their trip will not be seriously impacted by longer-than-expected border delays. Figure 2 shows the maximum delays travelers must plan for, at different levels of certainty, to avoid being late. If a non-NEXUS traveler at Peace Arch wants to be 95 percent certain that she will not arrive late, she must plan for a 55-minute wait at the border. A NEXUS

Figure 2. Maximum Likely Delay at Various Degrees of Certainty



traveler under the same circumstances would plan for a 7-minute wait (this difference slightly worsens on the weekends, as non-NEXUS delays grow while NEXUS delays are essentially unchanged). Given the greater variability and duration of non-NEXUS delays, even if a non-NEXUS traveler correctly plans on encountering a given delay, she is still far more likely to have her trip negatively impacted by unpredictable delays than a NEXUS traveler is. In this context, the increased predictability afforded to NEXUS travelers not only improves the efficiency of a given trip, but also decreases the possibility of unplanned delays.

Personal Time and Fuel Savings.

Personal Time: To monetize the time savings associated with NEXUS, we used the median figure from a range of U.S. Department of Transportation estimates for the cost of delay during travel (a per hour value of \$17.90).⁹ Table 2 shows the savings travelers accrue through NEXUS membership based on different numbers of trips, assuming they leave early enough to arrive on time for 95 percent of their trips. We know that roughly 60 percent of non-NEXUS travelers cross once a month or more, and over half of NEXUS travelers cross at least once per week.¹⁰ Thus, for the majority of those crossing the border, the savings from NEXUS accrue very quickly. Note that the \$50 cost of a NEXUS card is theoretically recouped after just two round trips.

Fuel: Time spent waiting to cross the border is, for the most part, time spent with an idling engine.¹¹ Because wait times are shorter for NEXUS members, they consume, on average, 0.055 fewer gallons of gasoline at each one-way crossing of the border.¹² Table 2 shows the gasoline savings from reduced idling times for NEXUS members at different numbers of trips. Although a NEXUS member’s financial savings from gasoline are small compared to the time savings, reduced idling times also correspond to a reduction in emissions. In addition to the carbon dioxide emissions shown in Table 2, idling engines emit various pollutants (nitrous oxides, volatile organic compounds, and carbon monoxide) which can pose public health hazards.

Table 2. Time, Fuel and Reduced Emission Benefits of NEXUS at Different Amounts of Travel

# Round Trips	Value of Time Spent in Queue (\$)			Gas Consumed in Queue (Gal.)			Lbs. CO ₂ ¹³
	Non-NEXUS	NEXUS	Savings	Non-NEXUS	NEXUS	Savings	Avoided
1	32.03	3.93	28.10	0.12	0.01	0.11	2.12
10	320.31	39.28	281.03	1.21	0.10	1.12	21.17
20	640.61	78.55	562.06	2.43	0.19	2.23	42.35
50	1,601.53	196.38	1,405.15	6.07	0.48	5.59	105.87
75	2,402.29	294.57	2,107.73	9.10	0.72	8.38	158.81
100	3,203.06	392.76	2,810.30	12.14	0.96	11.17	211.75

Individual and System-Wide Benefits.

Individual Benefits: NEXUS members not only experience savings in both travel time and fuel costs, but also can expect more predictability in planning cross-border trips. In addition, NEXUS members are provided with an expedited air-travel security-screening process in both Canada and the U.S. (TSA’s Pre-Check would otherwise cost \$85 for a 5-year membership¹⁴), and NEXUS members also are automatically enrolled in the Global Entry program offered by U.S. Customs, providing expedited clearance upon arrival in the U.S. after an overseas trip.

System-Wide Benefits: This *Brief* has focused primarily on the benefits that NEXUS membership provides to individuals. However, there are also a range of benefits that accrue at a broader scale. There is a strong public benefit associated with program expansion because growth in NEXUS membership also decreases delays for non-NEXUS travelers as it reduces the number of vehicles in the standard lanes. The reduction in idling that results from reduced delays not only reduces carbon

emissions, but may also reduce the public health effects of such emissions, particularly for those working at the border. There are also numerous security benefits associated with processing ‘trusted travelers’ in the land-border environment. Not only are such individuals pre-vetted, but information about them is transmitted to an inspector’s computer before the traveler reaches the inspection booth (see *sidebar on front page*). This provides officers with advance warning of any potential security concerns associated with a traveler. This also increases system-wide efficiencies, as individual officers can process more NEXUS travelers.

Conclusion. Enrollment in the NEXUS program is clearly in the best financial interests of cross-border travelers. The popularity of NEXUS in Washington and British Columbia suggests that many travelers appreciate the program’s benefits. However, more than half of all traffic is still non-NEXUS, despite substantially higher delays for such travelers. Recent surveys of cross-border travelers in the region¹⁵ found that about 15 percent of non-NEXUS travelers chose not to enroll in the program because the cost was too high or the application too rigorous. Twenty-five percent had no particular reason or were not familiar with NEXUS. These barriers could be addressed through public awareness campaigns and outreach activities.

Because an in-person interview is required at the time of enrollment, the proximity of NEXUS enrollment centers is an important factor in successfully expanding the program. A new NEXUS enrollment center located in Whatcom County has eased the application process for many in our region. However, for individuals not located near an enrollment center, obtaining a NEXUS card can be very inconvenient. Advocates for expanding NEXUS enrollment argue for mobile processing units, which could serve residents of Vancouver Island, or more remote locales of British Columbia.

Endnotes

1. Christopher Dingman is the Northern Border Transportation Specialist for the Federal Highway Administration, Michigan Division. Daniel Edgel is a BPRI research assistant and Economics major at Western Washington University.
2. Source: International Mobility and Trade Corridor Program (IMTC) 2015 Resource Manual (theimtc.com/data).
3. Source: U.S. Customs & Border Protection.
4. Source: 2013/2014 IMTC Passenger Vehicle Survey (2014). Border Policy Research Institute and Whatcom Council of Governments. Available at: www.wwu.edu/bpri/files/2014_Jul_PVIS_Final_Report.pdf.
5. Source: Bureau of Transportation Statistics (transborder.bts.gov/programs/international/transborder/TBDR_BC/TBDR_BC_Index.html).
6. Source: Cascade Gateway Border Data Warehouse (www.cascadegatewaydata.com).
7. Due to data availability, the period observed was November 1st, 2012 to October 31st, 2014. We included observations of primary inspection lanes, from 7 a.m. to midnight to capture the hours that a NEXUS lane was open. Only northbound data was used because that is believed to be the most accurate due to technical issues with the wait-time system.
8. A zero-value wait time in the Cascade Gateway Data Warehouse indicates a time span when traffic volumes were not large enough to generate a measurable queue.
9. Denoted in 2009 dollars. The range can be found at: www.transportation.gov/sites/dot.gov/files/docs/USDOT%20VOT%20Guidance%202014.pdf.
10. Source: 2013/2014 IMTC Passenger Vehicle Survey (2014). Border Policy Research Institute and Whatcom Council of Governments. Available at: www.wwu.edu/bpri/files/2014_Jul_PVIS_Final_Report.pdf.
11. Our analysis does not take into account the no-idling program in place at Peace Arch’s southbound crossing. By some estimates, this program reduces idling emissions by 45%. Further studies examining how widely-followed the non-binding policy is are warranted.
12. Tiwar, Singh, & Balwanshi (2013) estimate that the average fuel lost per minute of idling is about 3.7×10^{-3} gallons, and the difference in mean wait times between NEXUS and non-NEXUS users is 15.12 minutes.
13. Source: U.S. Energy Information Administration. Available at: www.eia.gov/tools/faqs/faq.cfm?id=307&t=11.
14. Details on the TSA Pre-Check program are available at: www.tsa.gov/tsa-precheck.
15. Source: 2013/2014 IMTC Passenger Vehicle Survey (2014). Border Policy Research Institute and Whatcom Council of Governments. Available at: http://www.wwu.edu/bpri/files/2014_Jul_PVIS_Final_Report.pdf.