The Impact of Sixteen Proposed PPTA Mega Projects on the Commonwealth of Virginia Economy

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Research Objective

The objective of this research was to calculate the post-construction impact of sixteen proposed PPTA Mega Projects (listing attached) on the growth of the Commonwealth of Virginia's economy—its gross state product (i.e., the value of goods and services produced within the State), the personal earnings accruing to workers residing in Virginia, and the new jobs supported by this gain in gross state product. These economic impacts are post-construction and do not include the short-term economic benefits that will accrue to the Commonwealth economy during the construction period as a result of the outlays for payroll and materials associated with design, engineering and construction of the transportation improvements.

The economic impacts identified herein are a result of lower transportation costs and reduced losses of transport time due to reduced congestion that result in lower production costs for the State's businesses, lower prices, less spending on vehicle maintenance and reduced energy costs, higher labor force productivity, and greater investment in productive capacity. These economic benefits will be partially offset by the user payments (tolls) raised to repay the bonds sold to fund the construction of these transportation improvements. The net effect of these savings and tolling costs will constitute the return on this transportation investment to the Commonwealth of Virginia's economy.

Research Findings

If all sixteen PPTA Mega Projects (see appendix) were in operation in 2010, the Commonwealth of Virginia economy would have been $4.1 billion dollars larger than it was in the absence of these highway improvements.   Additionally, these transportation savings and the economic activity they will generate would have added $2.9 billion in new personal (taxable) earnings to the State's income base and supported a total of 56,798 additional jobs within the Commonwealth. These annual benefits and costs are summarized in Table 1 below.

The sectoral distribution of these benefits and costs are shown in Table 2 and confirm that the benefits are widely distributed across all sectors in proportion to

the contribution of transportation to their production costs for goods and services and the contribution of labor (labor-intensive businesses would realize larger benefits than businesses having less labor intensity); wage and salary differentials across the State's economy also influence the distribution of these benefits.

Table 1

Change in Virginia Gross State Product Resulting
from Proposed PPTA Mega Projects by Source, 2010
(in millions of 2010 dollars)

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Sources	Savings (costs)
2010 Baseline GSP	$391.488
Employee Utilization Effects	2.628
Business Investment Effects	1.822
Price Effects	.374
Effect of Reduced Transportation Spending by Businesses	(.269)
Effect of Reduced Transportation Spending by Consumers	(.495)
Total Value of Added GSP	$4.061
Net Gain in Personal Earnings	$2.936
New Jobs Supported by Added GSP	56,798

Sources: EMSI, Inc and GMU Center for Regional Analysis

The costs (toll payments) are shown to impact the businesses from which consumption expenditures by individuals (households) and businesses are redirected to pay for the tolls to use these transportation facilities. All sectors exhibit some losses of sales but the retail sector experiences the greatest sales loss as a result of consumers shifting their spending patterns to include toll charges. For the State's businesses, reduced truck maintenance and fuel costs resulting from less congested traffic flows and faster travel times would result in less spending for transportation equipment and maintenance services among other reductions in operating costs.

On a net basis, the benefits generated by these transportation improvements (greater labor force efficiency, lower labor costs, lower transportation operating costs, lower prices on goods and services produced in the State) exceed the costs (lost sales and tolling costs) for all sectors, resulting in an overall net contribution to

GSP totaling $4.061 billion per year and new personal earnings for resident workers in the State totaling $2.396 billion.

Even though this analysis is static, holding 2010 traffic volumes, savings and costs, and the economy's sectoral structure constant (the State's economy would likely have experienced a favorable shift in the structure that would increase the magnitude of the economic returns on transportation investment in successive years), these gains in gross state product (GSP) and added personal earnings will recur each year and are cumulative. If the direct State costs of funding these highway improvements were 25 percent of total construction costs, with the remainder being paid for by toll collections, it would require less than two years of this additional economic growth (added GSP) to equal the State's cost share of these PPTA Mega Projects.

Research Methodology

Improved traffic flow and reduced congestion costs are the primary benefits that result from major highway improvements. These benefits can be measured in terms of: (1) the reduction in transportation costs within the State's economy, (2) increased labor force efficiency or productivity resulting from re-capturing lost work time and output value lost due to traffic delays; and (3) reductions in vehicle operating costs—maintenance and fuel costs.

These cost savings generate economic impacts across the State's economy that would be reflected in price decreases for the goods and services produced in the State and increased business investment resulting from business cost savings or increased profits (it is assumed that 75% are reinvested and 25% retained or distributed as profits). The vehicle operating cost savings that will accrue to the highway users, both private vehicle operators and commercial vehicle owners will result in spending reductions for maintenance, repair, fuel, automotive replacement parts and vehicle replacement that will reduce sales in related businesses. However, these savings (lost sales) will be re-spent elsewhere within the economy generating other sales and related economic activity.

The tolls charged for use of the new highway facilities will be a subtraction from the current economy and will generate reduced consumer sales across the breadth of the economy. It is assumed that annual toll charges will total $1 billion with these costs split between private vehicle operators and commercial users on an 80/20 basis, reflecting the current vehicle split on the State's primary highways and the difference in toll fees for two-axle vehicles and trucks and busses.

These tolling costs for private vehicle operators will be partially offset by vehicle operating cost reductions. These lower maintenance and fuel costs will save the private vehicle operator an estimated $265.7 million a year. Also, drivers and passengers in these vehicles will benefit from personal time savings (time available for other purposes from foregone travel time delays), a value that cannot be reflected in the Input-Output Model of the State's economy. These personal time

savings have been shown to represent a significant intangible value for which drivers are willing to pay tolls. The value of annual time savings accruing to commuters who will be using the I-495 HOT Lanes in 2015, during the three AM and three PM peak traffic hours, have been calculated to total $50.9 million (Stephen S. Fuller, "The Economic Impact of the Capital Beltway HOT Lanes in 2015," Transurban, February 2010). The tolls paid by commercial vehicles for use of these new transportation facilities will be offset by cost savings resulting from faster delivery times and reduced vehicle maintenance, fuel and replacement costs. These cost savings will result in lower prices and increased competitiveness leading to higher sales and increased business investments.

The key determinants of the cost savings resulting from the faster average travel times realized from these highway improvements are: the number of vehicles benefiting from these improvements and the change in travel time that results from these highway improvements. The VMT for these primary highway routes affected by the sixteen proposed Mega Projects is currently 39.2 million accounting for 36.6 percent of total VMT on the State's primary highway network. The expected travel time savings derived from higher average operating speeds is 16.0 percent (51.725 mph vs. 60 mph). Statewide, across the full primary state highway system, this travel time savings would reduce highway-based transportation costs by 5.85 percent. The cost saved from reduced maintenance and increased fuel efficiency per vehicle mile traveled per day by a two-axel vehicle as a result of this faster average travel time is estimated $0.01857.

The cost of goods and services produced within the Commonwealth will decrease as a result of the reductions in transportation costs and the resulting price competition will generate lower prices for consumers. These lower prices will result in increased sales. The impact of these price effects on the economy's expansion is calculated to total $374.4 million annually.

Labor force efficiency gains resulting from faster travel on the State's primary highway network will be achieved from a reduction of lost work time (congestion delays) and increased productivity. For the purposed of this analysis, it is assumed that the statewide labor force efficiency benefit will be equivalent to a one percent (1%) increase in productivity; this would translate into an average of 5 minutes per workday of added work time at no increased cost to the employer.

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Table 2

SUMMARY EFFECTS TABLE:
Change in Virginia Gross State Product Resulting from Transportation Improvements

Code	Name	2010 Baseline GSP ($1,000)	Employee Utilization Effects ($1,000)	Business Investment Effects ($1,000)	Price Effects ($1,000)	Effect of Reduced Transpt. Spending by Businesses ($1,000)	Effect of Reduced Transpt. Spending by Consumers ($1,000)	Total Effect Change GSP ($1,000)	Total Effect Change Earnings ($1,000)	Total Effect Change Jobs	GSP Percent Change %
11	Agriculture, Forestry, Fishing and Hunting	$1,928,527	$16,023	$10,816	$3,851	-$748	-$2,290	$27,653	$17,145	948	1.4%
21	Mining, Quarrying, and Oil and Gas Extraction	$2,457,968	$15,655	$15,343	$4,676	-$547	-$1,333	$33,794	$14,926	229	1.4%
22	Utilities	$6,390,143	$46,419	$2,995	$4,289	-$3,287	-$9,369	$41,047	$10,405	83	0.6%
23	Construction	$16,653,356	$129,426	$338,018	$29,220	-$4,853	-$9,587	$482,223	$431,754	8,415	2.9%
31-33	Manufacturing	$28,712,087	$196,005	$170,204	$33,340	-$9,059	-$24,831	$365,659	$200,331	3,242	1.3%
42	Wholesale Trade	$16,255,733	$125,104	$136,490	$34,278	-$19,414	-$26,214	$250,245	$145,065	1,963	1.5%
44-45	Retail Trade	$22,015,446	$160,387	$170,829	$31,042	-$33,034	-$101,060	$228,165	$145,705	5,154	1.0%
48-49	Transportation and Warehousing	$10,899,604	$88,984	$475,926	$70,589	-$85,699	-$15,219	$534,580	$405,356	7,743	4.9%
51	Information	$18,197,693	$136,763	$10,789	$10,401	-$7,355	-$19,566	$131,032	$57,193	676	0.7%
52	Finance and Insurance	$26,614,951	$198,036	$2,967	$13,349	-$16,968	-$42,769	$154,616	$87,201	1,218	0.6%
53	Real estate and Rental and Leasing	$25,914,081	$228,818	$5,852	$20,078	-$17,816	-$50,127	$186,806	$41,685	1,497	0.7%
54	Professional, Scientific, and Technical Services	$54,280,666	$350,133	$86,712	$24,073	-$11,199	-$25,793	$423,926	$370,977	4,173	0.8%
55	Management of Companies and Enterprises	$10,560,417	$69,668	$48,669	$9,145	-$3,301	-$6,158	$118,023	$99,819	872	1.1%
56	Administrative and Support and Waste Management and Remediation Services	$10,986,018	$99,857	$64,695	$15,740	-$8,552	-$12,279	$159,462	$134,982	4,066	1.5%
61	Educational Services	$4,327,308	$28,264	$10,567	$2,112	-$2,705	-$8,456	$29,783	$26,261	701	0.7%
62	Health Cage and Social Assistance	$24,670,690	$174,497	$138,765	$15,393	-$20,799	-$65,560	$242,296	$222,437	4,525	1.0%
71	Arts, Entertainment, and Recreation	$2,411,963	$19,119	$5,197	$1,727	-$1,685	-$5,093	$19,265	$14,165	766	0.8%
72	Accommodation and Food Services	$9,834,458	$75,291	$26,752	$7,683	-$7,266	-$22,273	$80,188	$51,774	2,754	0.8%
81	Other Services (except Public Administration)	$10,180,597	$71,004	$100,859	$9,981	-$6,534	-$32,711	$142,600	$123,948	3,539	1.4%
90	Public Administration	$88,196,001	$398,739	$0	$33,419	-$7,873	-$14,509	$409,775	$335,073	4,233	0.5%
	TOTAL	$391,487,708	$2,628,194	$1,822,445	$374,388	-$268,693	-$495,196	$4,061,138	$2,936,203	56,798	1.0%

Appendix Table 1

PPTA/Mega Projects

Project	Construction Estimate	VDOT Oversight Estimate for Development and Construction	VDOT Funding Needed per Agreement with Private Partner	SYIP Funds	Future Funding Needs from SYIP or Private Partner
Route 495 HOT Lanes	$1,900,000,000	$0	$408,895,554	$408,895,554	$0
I-95/395 HOT Lanes Project	$1,300,000,000	$85,000,000	$35,000,000	$40,000,000	$1,345,000,000
Downtown Tunnel/Midtown Tunnel/MLK Project	$1,900,000,000	$256,000,000	$30,000,000	$178,765,061	$1,947,234,939
Coalfields Expressway	$4,000,000,000	$214,745,015	$32,000,000	$86,745,015	$4,096,000,000
I-64 - Richmond to Hampton Roads	$1,800,000,000	$72,000,000	$0	$0	$1,872,000,000
Hampton Roads Third Crossing	$4,835,000,000	$193,400,000	$0	$10,193,786	$5,018,206,214
Hampton Roads Bridge Tunnel	$2,350,000,000	$94,000,000	$0	$0	$2,444,000,000
Route 460 Corridor Improvement Project	$2,000,000,000	$80,000,000	$0	$0	$2,080,000,000
I-66 HOT Lanes	$1,500,000,000	$60,000,000	$0	$0	$1,560,000,000
Southeast Parkway & Greenbelt	$1,710,797,322			$8,005,776	$1,702,791,546
Route 17 - Dominion Boulevard	$392,855,034			$45,319,629	$363,760,547
Route 895 - Airport Connector	$61,231,644			$61,030,408	$201,236
Route 58	$325,944,511			$120,358,006	$205,586,505
Route 81 **	$5,100,000,000				$5,100,000,000
Route 73	$661,168,737			$10,988,202	$650,180,535
Route 28	$137,216,508			$125,015,840	$12,200,668
Total	**$29,974,213,756**	**$1,055,145,015**	**$505,895,554**	**$1,095,317,277**	**$28,397,162,190**
					$709,929,055

Note: All project estimates except Route 495 are an approximation and will change over time. The I-66 HOT Lanes estimate is the median figure between Route 495 HOT Lanes and I-95/395 HOT Lanes. Coalfields Expressway could be half the $4 billion with the coal synergy approach.

** Construction estimate from 2005 Tier I EIS Executive Summary, pp ES-vi, vii, and viii. Http://www.virginiadot.org/projects/resources/Executive _Summary.pdf

Information in this table provided by Virginia Department of Transportation