



Economic Impacts of Transportation Infrastructure Improvements

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To assess for all modes of transportation (highway, rail, transit, aviation) :

- Jobs & income supported by **capital spending** (2009-2014)
- Jobs & income supported by **operations & maintenance spending** (2009-2014)
- Jobs & income generated by **transportation improvement projects** (2010-2035)
- **Overall Impacts** on income and the economy
- **Jobs per dollar** of investment
- **Benefit-Cost Ratio**

*Credits: study by Economic Development Research Group (EDRG)
with Cambridge Systematics and DelCan*

Three Steps

- 1) Assemble project lists and spending for 2009-2014 from VDOT, DOAV, VPA and DRPT.
- 2) Analyze impacts on facility capacity & use; user travel distance, speed & cost; service reliability & safety.
- 3) Apply TREDIS* (Transportation Economic Development Impact System) to estimate overall impacts on the Virginia economy

** TREDIS is the nation's leading system used to assess economic impact of transportation; it has been used by states and MPOs in 34 states and provinces, covering all modes*

Highways

- Based on VDOT Six Year Improvement Plan (*VDOT*)
- Capital projects with capacity or performance enhancement
- Ongoing - operations & maintenance, reconstruction and administration

Aviation

- Based on State Airport System Plan Investments from 2009 to 2014 (*DOAV*)
- Capital projects with operational benefits (capacity, delay) - \$314m
- Projects required for safety & other regulation - \$467m
- Ongoing – study of current airport-related jobs and activity

Ports

- Based on Virginia Port Authority 2040 Master Plan (*VPA*)
- Capacity enhancement projects initiated only during 2009-2014
- Ongoing – study of current port-related jobs and activity

Transit/Rail

- Commonwealth Transportation Board “Six Year Projection for Rail and Public Transportation Improvement Program”(\$2.345b) and DRPT Six Year Rail Plan
- Also VDOT’s six-year improvement plan (\$64m transit + \$31m pass rail)
- Ongoing – transit operations support flowing through the state

Project Spending Profile

Spending Over Six Years (2009 – 2014)	Amount (millions)
Highways: Capital (system, earmarks)	\$ 6,455 m <i>(also incl. VDOT contributions to public-private projects)</i>
Aviation: Capital (functional improvement projects)	\$ 314 m <i>(also incl. FAA funding)</i>
Aviation Capital (safety/conformity projects)	\$ 467 m <i>(also incl. FAA funding)</i>
Port : Capital Construction Projects	\$ 745 m
Public Trans & Rail : Capital	\$ 2,441 m
TOTAL CAPITAL INVESTMENT \$	\$ 10,422 m

Highways: Ongoing Operation & Maintenance	\$10,641 m
Aviation : Terminal Operation (excl IAD-DCA)	\$ 4,832 m
Port : Ship & Harbor Operation (payroll only)	\$ 1,997 m
Public Trans: Ongoing Operations Support	\$ 1,066 m <i>(state & federal funds)</i>
VDOT Administration	\$ 1,465 m
TOTAL OPERATIONS \$ (excl IAD and DCA)	\$20,001 m

Impact of Spending Money on Capital Investment and on Operations/Maintenance

- Spending going directly to Virginia workers and businesses
- Indirect/ effects: supplier industries
- Induced effects: spending of added worker wages
- Measured by increased employment, business output, value added and wages

Short-Term Spending Impact

Total Effect on the Virginia Economy, 2009-2014

Category	Total Over Six Years	Average Year	Per \$mil Spent
Capital Investment Spending (\$ mil)*	\$ 10,422	\$ 1,737	--
Employment (Jobs)	142,082 <i>(job-yrs)</i>	23,680	14
Business Output (\$ mil)*	\$ 18,780	\$ 3,130	1.8
Value Added (GRP)(\$ mil)*	\$ 9,740	\$ 1,623	0.9
Worker Income (\$ mil)*	\$ 7,518	\$ 1,253	0.7
Capital + Operations Spending (\$ mil)*	\$30,423	\$5,070	--
Employment (Jobs)	468,850 <i>(job-yrs)</i>	78,142	15
Business Output (\$ mil)*	\$56,172	\$9,360	1.8
Value Added (GRP)(\$ mil)*	\$29,302	\$4884	1.0
Worker Income (\$ mil)*	\$20,340	\$3,890	0.7

** Note: Dollar amounts can not be added together because impact categories are different measures of related economic impacts. Specifically, worker income is a subset of value added, and value added is the portion of business output that does not go for materials and supplies.*

Tax Revenue Impact – Six Years

Total Over Six Years (2009 - 2014) from Capital + Operations Spending

Revenue Category	State /Local Revenue Impacts (\$ Millions)
Household + Business Income Tax	\$ 410
Sales Taxes	\$ 695
Property Tax	\$ 481
Social Insurance Payments	\$ 20
Other Taxes & Fees	\$ 696
TOTAL	\$2,302

- **Step 1: Incremental Effect of Capital Investments on Changes in Travel Conditions**
 - Direct cost savings due to reduced user time delay & expense
 - Direct cost savings due to enhanced safety & reliability
 - Direct cost savings due to enhanced intermodal capacity & connectivity
 - Growth enabled by elimination of air/sea capacity constraints

- **Step 2: Effect of Travel Changes on Economic Growth**
 - Direct, indirect & induced effects on household costs, business operating costs, productivity & competitiveness
 - Adjustment for “leakage” of income and savings going to businesses & households out of Virginia.
 - Measured by increased VA employment, business output, value added, wages

Long-Term Capital Investment Impact

Effect on the Virginia Economy, 2010-2035, reflecting the post construction impacts on transportation system efficiency (for travelers & shippers), and business attraction and expansion due to productivity, competitiveness and improved market access. Based on \$9.955 billion of productive investment over 26 years.

Impact Category	Avg. Year 2010-2035	Year 2035 Impact	Sum of 2010-2035	Per \$mil of Capital Investment
Employment (Jobs)	23,523	101,932	611,590	58.8
Business Output (\$ mil)*	\$ 3,137	\$13,594	\$ 81,566	\$ 7.8
Value Added (\$ mil)*	\$1,539	\$ 6,668	\$4 0,006	\$ 3.8
Worker Income (\$ mil)*	\$ 1,025	\$ 4,441	\$ 26,645	\$ 2.6

* Note: Dollar amounts can **not** be added together because impact categories are different measures of related economic impacts. Specifically, worker income is a subset of value added, and value added is the portion of business output that does not go for materials and supplies.

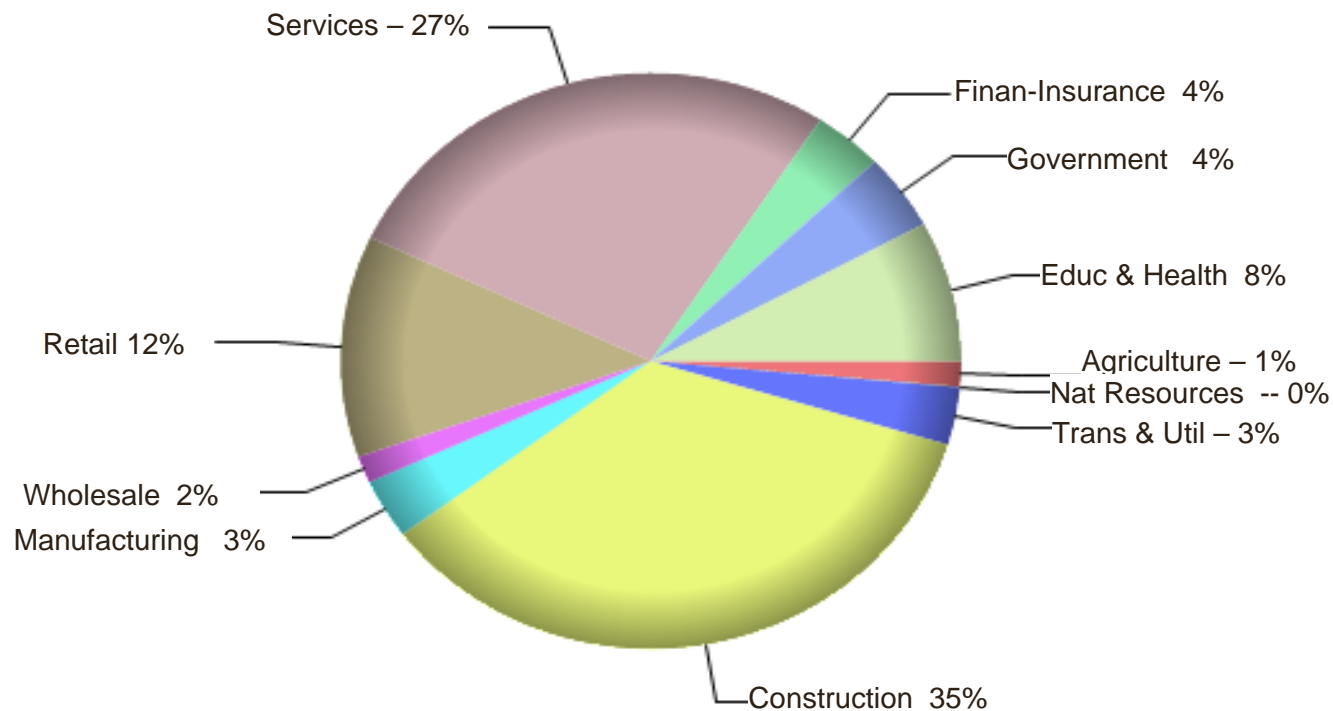
Total Job Impact of Six Year Spending

Total Impact of all investments *(rounded numbers)*

Capital Investment	142,100 Job-yrs over 6 yrs	(23,700/yr)
Operations	326,700 Job-yrs over 6 yrs	(54,400/yr)
Total Six-Year Program	468,800 Job-yrs over 6 yrs	(78,100/yr)
Long-Term Impact of Capital Investment	611,600 Job-yrs over 26 yrs	(23,500/yr)
Total	1,080,400 Job-yrs total	

Mix of Job Impacts from Capital Investment

96% of jobs generated by capital investment are private sector



Benefit-Cost vs Economic Impact

- **Both** account for all household & business cost savings, plus travel time savings & reliability for business travel.
- **Economic Impact Analysis** counts only impacts on income flow in the economy.
- **Benefit-Cost Analysis** also counts personal travel time savings as well as safety & environmental enhancement, but excludes business competitiveness and growth impacts.

Benefit-Cost Findings (4% discount rate)

<u>Benefit/Cost Findings</u>	<u>Value (\$ millions)</u>
Present Value of Cost Stream (2009-2014)	\$ 9,167
Present Value of Benefit Stream (2010-2035)	\$ 36,645
Net Present Value (=Benefits - Costs)	\$ 7,478
B/C Ratio (=Benefits / Costs)	4.0

<u>Economic Impact Findings</u>	<u>Value (\$ millions)</u>
\$ Value Added per \$1 million of capital investment	3.8

* Capital cost of \$9,955m = \$10,422m - \$467m of regulatory required airport improvements

Summary of Findings

For every \$Million of Capital Investment & Operations Spending

- Short-term effect: 14-15 immediate jobs in VA during same year of spending
- Long-term effect of capital improvement: 59 job-years over 26-yrs (2.3/year)

Total Impact of \$30 billion spending on Six-Year Plan

- \$56 billion of business sales in Virginia generating \$29 billion of worker wages
- 468,800 Job-yrs over 6 yrs. (78,100/yr)
- At least \$2.3 billion of state and local tax revenues
- Plus long-term (26 yrs): \$82 billion of business sales; 611,590 Job-yrs (23,500/yr), of which 96% are private sector

Return on Capital Investment (*net present value*)

- Benefit-Cost Ratio of 4.0 to 1 (total benefit / investment)
- Economic Return Ratio of 3.8 to 1 (gross domestic product/ investment)