



**Virginia's Long-Range Multimodal
Transportation Plan
2007-2035**

**ECONOMIC DEVELOPMENT
ISSUE PAPER**

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WHAT IMPACTS WILL TRANSPORTATION HAVE ON ECONOMIC DEVELOPMENT IN VIRGINIA?

Economic development is defined as the vitality and health of the Virginia economy, including the quality of life and the economic prosperity of its citizens. The Commonwealth of Virginia is the nation's premier economic development success story over the last few decades. Virginia went from the 30th rank in state per capita income in 1970 to the 10th rank in 2006, a far greater improvement in its relative rank than for any other state. The state with the largest negative change, Alaska, which went from 1st to 17th, also changed in rank by less than did Virginia. (Source: Bureau of Economic Analysis, *Survey of Current Business*.)

Simply put, Virginia had the largest relative per capita economic change of any state, and the change was highly positive. While a great deal of Virginia's change in per capita income can be attributed to Northern Virginia's growth and to its proximity to Washington, D.C., the success of Virginia over the last four decades has been extraordinary. But further economic development will also be critical for Virginia's future, and attention needs to be given to what transportation can do to enhance the economy of the Commonwealth.

As part of the VTrans2035, a study has been conducted to assess the economic impacts of transportation infrastructure improvements on Virginia's economy, using the state-of-the-art of economic impact analysis. The analysis covered a wide range of measures for all modes and types of transportation investment, including:

- Jobs and income supported by capital spending from 2009 to 2014;
- Jobs and income supported by operations and maintenance spending from 2009 to 2014;
- Jobs and income generated by transportation improvement projects from 2010 to 2035;
- Overall impacts on income and the economy;
- Jobs per dollar of investment; and
- Benefit-cost ratio.

This range of measures is necessary because of the different ways in which transportation impacts on the economy. The first impact is a "spending impact": spending money on capital investment and on operations and maintenance provides money to Virginia workers and business, which also causes indirect effects from money spent on supplier industries, and induced effects from the spending of additional worker wages. This is measured by increased employment, increased business output, value added and wages added.

The second type of measures occur due to the impacts of the specific transportation investments on changes in travel conditions, and the impacts of those changed travel conditions on economic growth. The changes in travel conditions include direct cost savings to users, direct safety and reliability savings to users, direct savings due to enhanced intermodal capacity and connectivity, and growth enabled by elimination of capacity constraints. These impact economic growth through the changes they cause in household and business costs, productivity, and

competitiveness. The overall impacts also result in increased Virginia employment, business output, value added and wages.

The analysis results indicated that the total effect on the Virginia economy from transportation investments will be highly positive, both for the short term and for the long term. In fact, the return on investment from transportation is outstanding no matter what measure of the future economy is utilized. Each million dollars of transportation capital investment was calculated to yield:

- \$7.8 million more in business output;
- \$3.8 million more value added to the Virginia economy;
- \$2.6 million more added to wages in Virginia.

In summary, what the proposed transportation investments do for Virginia is to increase the overall economy by so much that there is much more money to invest in all of the other possible investments that anyone could make. It should be noted that the dollar amounts above cannot be added because these are different measures. 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.

WHY IS ECONOMIC DEVELOPMENT IMPORTANT?

Economic vitality is identified as one of the key goals in the VTrans2035 vision:

“Goal - Economic Vitality

Improve Virginia’s economic vitality and facilitate the coordination of transportation, land use and economic development planning activities.

Objectives for this goal are to improve the accessibility of the existing workforce and to improve the movement of goods to markets and people to goods /services. Another objective is to promote an efficient use of future transportation facilities and services. The purpose is to place the leadership and citizens in position to take advantage of the current transportation network to strengthen the economy through the movement of people and goods throughout the Commonwealth of Virginia.”

Economic development is critical to the vitality of the Commonwealth, its communities, and its citizens. Virginia has had strong success in promoting and achieving economic development. However, this success will be threatened if the transportation system cannot support economic development due to deteriorating conditions and declining performance. A healthy transportation system, by contrast, can be a strong spur to future economic development.

At this time, in 2009, the status of the economy is critical to every citizen, community, and business in Virginia. The lack of growth of real personal income which has afflicted the vast majority of Americans since 2000 has now turned into an economic downturn which concerns

virtually all citizens and businesses. While Virginia has historically fared better than other states in recent times, economic development is now a critical immediate issue as well as a long term concern.

Transportation investment affects the economy through three mechanisms: (1) spending *impacts* -- the act of spending money on transportation facilities and operations supports jobs in those industries; (2) *traveler impacts* – the provision of transportation services provides enhanced mobility, time and cost savings; and (3) *broader economic development impacts* – economic growth occurs as a result of changes in productivity, market access and competitiveness.

- *Spending* creates jobs and income through expenditures on wages for workers and spending on orders for materials and services that are needed to construct and develop transportation facilities, and to provide their ongoing operation.
- *Traveler Impacts* associated with an improvement in transportation services or the increased availability of service can include savings in travel time, savings in travel costs, and savings in accident costs.
- *Broader Economic Development Impacts* include increases in jobs and income resulting from the growth of activity at suppliers of goods and services to serve the expanding construction of transportation facilities, vehicles, and other equipment, and the expanding operations of transportation services. They can also include induced economic growth associated with the additional workers spending their income throughout the economy. In addition, though, there can also be household and business cost savings enabled by broader access to employment, education, health care and shopping opportunities. Particular attention has been given to the effect on business productivity enabled by factors such as a larger scale of customer markets, improved access to a greater diversity of labor market skills, and the business agglomeration (cluster) economies associated with enhanced transportation access.

It is acknowledged that many other factors besides transportation impact economic development, such as education.

WHAT ARE THE CURRENT ECONOMIC DEVELOPMENT CONDITIONS IN VIRGINIA?

The following sections are excerpted directly from the 2007 Transportation Performance Report. “Economic Vitality – Provide a transportation system that supports economic prosperity” - is one of the key areas monitored in the report, and several performance indicators are compiled which are relevant to the economy.

Key economic vitality performance measures include:

- Transportation Sector’s Employment;
- Freight Shipped Through the Port of Virginia;

- Number of Enplanements; and
- Percentage of Transportation Expenditures on Small, Women and Minority Businesses.

The figure below from the Transportation Performance Report shows the desired trends versus the actual recent year 2007 performance trend for each of these performance measures. For the first three measures of transportation employment, freight, and number of enplanements, there will be challenges in achieving desired trends in the near term. For the last measure of percentage of expenditures on small, women and minority business enterprises, the Commonwealth has strong momentum and the temporary economic downturn is unlikely to reverse the percentages. The year 2008 was impacted strongly by the downturn in the national economy.

Economic Vitality: Performance Summary B

Performance Measure	Desired Trend	Performance Trend
Transportation Sector's Employment	↑	↓
Freight Shipped through the Port of Virginia	↑	↑
Number of Enplanements	↑	↑
Percentage of Transportation Expenditures on Small, Women and Minority Businesses	↑	↑

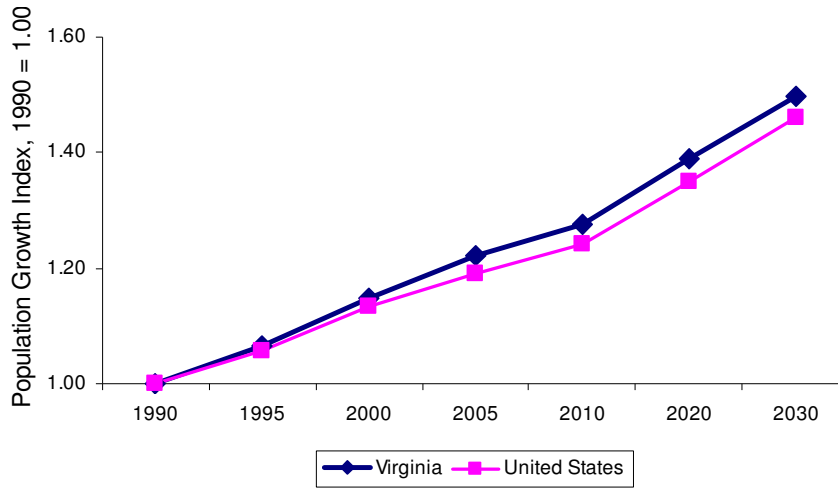
Source: 2007 Transportation Performance Report.

WHAT ARE THE ECONOMIC DEVELOPMENT TRENDS AND FORECASTS FOR VIRGINIA?

Virginia has been an economic development success story, although not all parts of the Commonwealth have grown at the same rates. Virginia includes some of the nation's most wealthy counties and jurisdictions, but there is also poverty. It is a goal that future economic vitality be widespread.

Another paper prepared for VTrans2035 is the "VTrans Forecasts of Socioeconomic Activity and Travel Demand", which gives a complete summary of the current and forecast population, economic factors, and travel. This information serves as the basis for the demographic and economic forecasts of VTrans2035. While the forecasts may be out of date in relation to the very recent short term trends, they can form the basis for the consideration of future population and economic trends. The recent past also provides good information about conditions in Virginia. Figure 1 below, from the ongoing Statewide Freight Study shows that Virginia's recent population growth exceeds the national average and is expected to continue doing so.

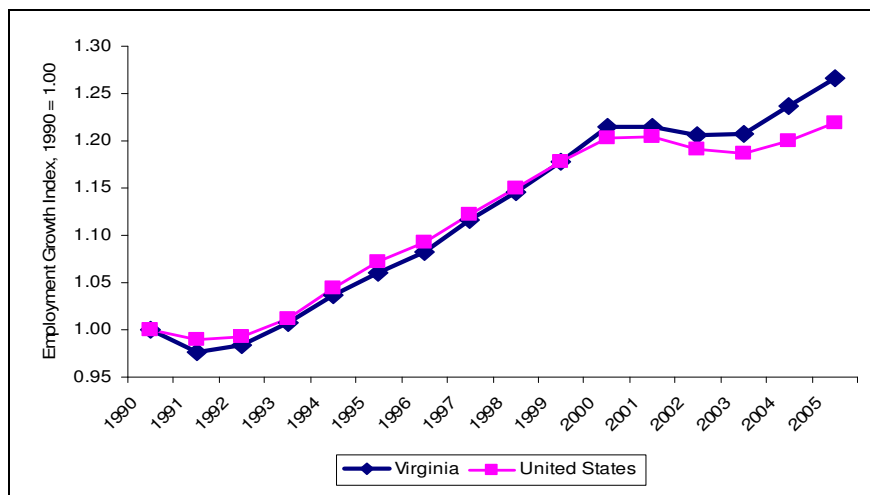
Figure 1 Historic and Projected Population Growth Trends in the United States and Virginia



Source: U.S. Census Bureau and Virginia Employment Commission

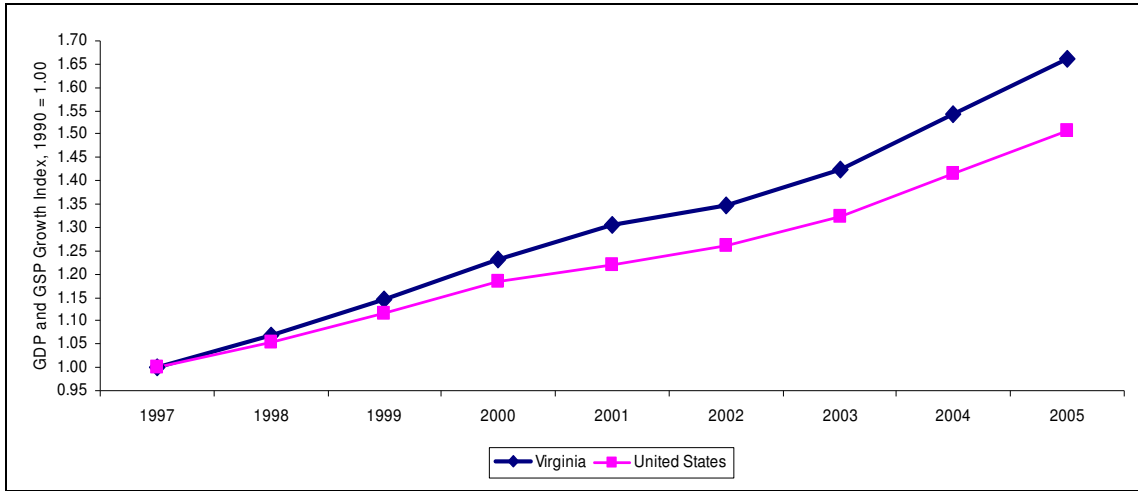
The freight study has also documented that Virginia has been slightly ahead of recent national growth trends in terms of jobs growth (see Figure 2). Between 1990 and 2005, the total employment in Virginia increased by 27 percent, compared to a U.S. growth of 22 percent. The Virginia economy has also been surpassing the United States in terms of growth in Gross State Product (GSP). In nominal terms, the Virginia GSP grew by 66 percent between 1997 and 2005, compared to a 51 percent increase in the U.S. Gross Domestic Product (see Figure 3). If Virginia were a country, its economy would be equivalent in size to Sweden's or Turkey's, ranking as the 20th largest in the world.

Figure 2 Historic Employment Growth Trends in the United States and Virginia



Source: Bureau of Labor Statistics

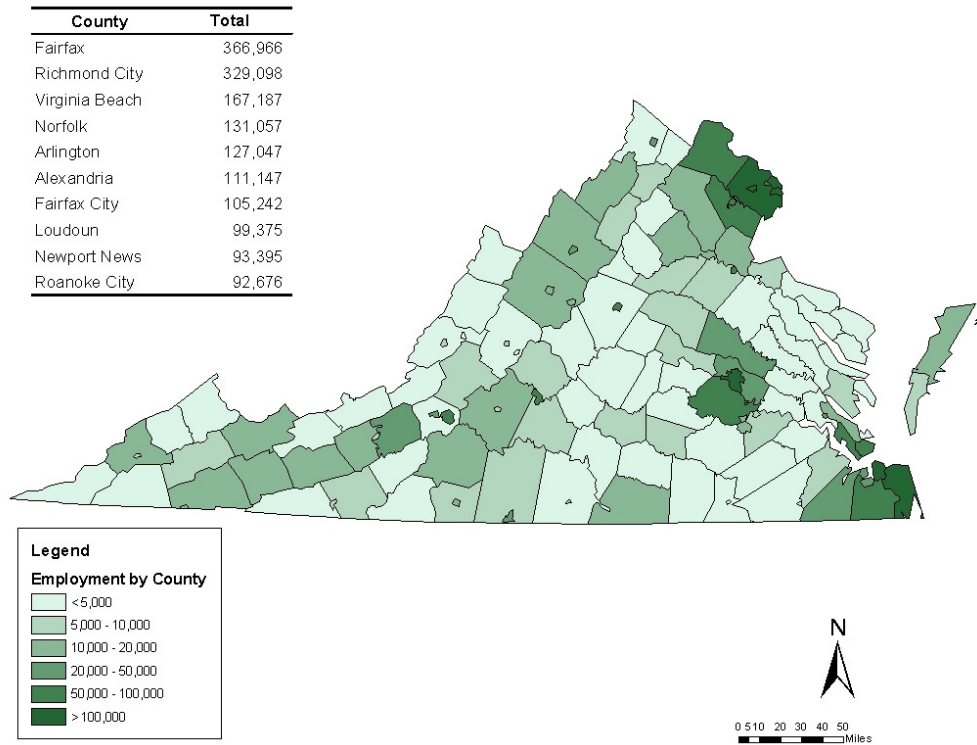
Figure 3 Historic GDP and GSP Trends in the United States and Virginia



Source: Bureau of Economic Analysis

Economic activity and employment are not distributed equally throughout the state. Figure 4 shows the distribution of employment in Virginia by county. The highest job concentrations in the state are located in the Northeast (Fairfax, Alexandria, Loudon) in metropolitan Washington D.C., in the East-Central (Richmond, Henrico, Chesterfield), and in the Southeast (Virginia Beach, Norfolk, Hampton) regions of the state.

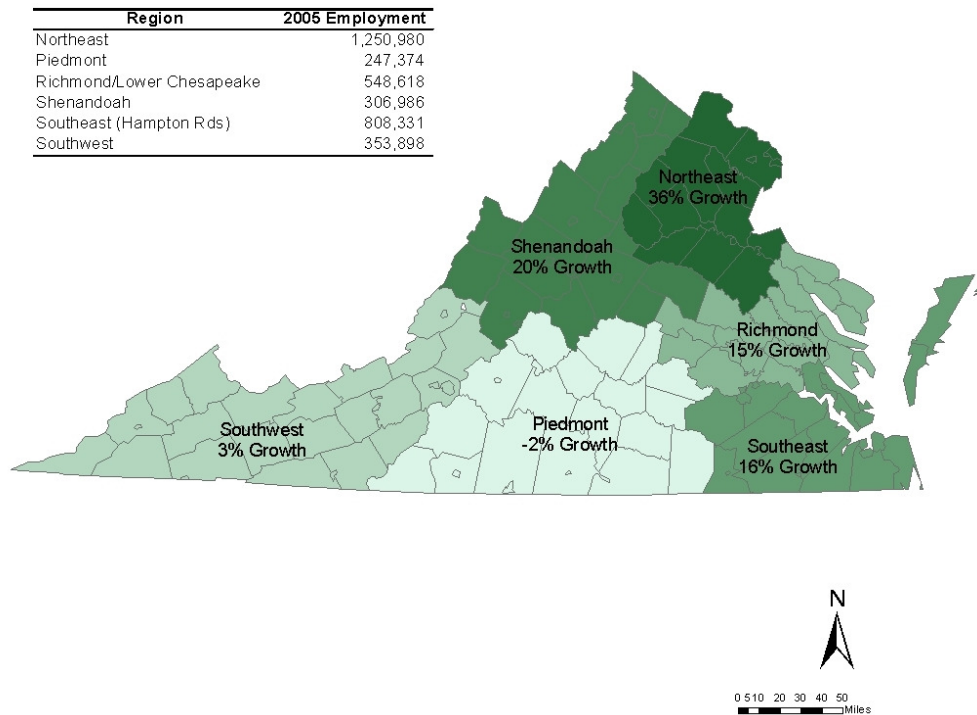
Figure 4 – Employment by County in Virginia, 2004



Source: Virginia Employment Commission, 2005.

Figure 5 illustrates that from 1995 to 2005, most of the state’s strongest jobs growth also took place along the east portion of the state, specifically the northeastern part, with the Northeast experiencing 36 percent growth and the Shenandoah region growing by 20 percent. Richmond and the southeast region also grew strongly, posting increases of 15 and 16 percent, respectively. The southwest region grew by only three percent between 1995 and 2005, while the Piedmont region saw jobs decrease by about two percent.

Figure 5 – Employment Growth by Region, 1995-2005



Source: Virginia Employment Commission, 2005.

The VTrans2035 status and forecasts of socioeconomic conditions in the Commonwealth are more fully documented in the “VTrans Forecasts of Socioeconomic Activity and Travel Demand”. The summary socioeconomic forecasts include:

- “Between 2010 and 2035, the Commonwealth’s population will grow by about one third from slightly more than 8 million to between 10.28 million (VEC, 2008) or 10.93 million (NPA, 2008). The proportion of persons 65 and over will increase from about 12% to 19%, such that Virginia will have about two million individuals 65+ in 2035 compared to about a million in 2010.
- Four planning district commissions (PDCs) are responsible for between 76% (VEC, 2008) and 81% (NPA, 2008) of Virginia’s population growth for the period 2010 – 2035. For example, (NPA, 2008) shows that 2.34 million of the 2.87 million additional population in Virginia by 2035 comes from these four PDCs: Northern Virginia (1.23 million), Hampton Roads and Richmond Regional (0.41 million each), and George Washington (0.28 million). (As discussed in this report, PDC boundaries were modified slightly to avoid the double counting of counties that are members of more than one PDC.)
- Between 2010 and 2035, employment will increase from 5.21 million in 2010 to 7.75 million in 2035 (NPA, 2008). As with population, much of this growth (84%) will be concentrated

in four PDCs: Northern Virginia (1.28 million), Richmond Regional (0.37 million), Hampton Roads (0.35 million), and George Washington (0.15 million).

- Real household income (in 2000 dollars) will increase by about half, from \$99,159 per household in 2010 to \$148,948 per household in 2035. Thus, generally each PDC is forecast to see its real household income grow between 38% and 60%.
- Population and employment growth rates by PDC between 2010 and 2035 will be more variable than household income growth rates by PDC (NPA, 2008; VEC, 2008). Population growth rates will vary between approximately 3% (Cumberland Plateau) and 73% to 80% (George Washington). Employment growth rates vary between 8% (West Piedmont and Southside) and 90% (George Washington).
- Although each PDC's average household income is expected to grow by between 38% and 60% noted above, the 2010 incomes themselves vary substantially by PDC. For example, the smallest average household income in 2010 (\$56,222 in Lenowisco) will be less than half the largest average household income (\$143,371 in Northern Virginia)."

VIRGINIA'S ECONOMIC DEVELOPMENT LEADERSHIP

VTrans2035 will be an important part of continuing the economic development leadership of Virginia. Both public and private groups contribute to the economic success which the Commonwealth has enjoyed. The Virginia Economic Development Partnership identifies these key elements of transportation infrastructure as critical to Virginia's success:

- Fourteen railroads operating on more than 3,400 miles of railway;
- Fourteen commercial airports including two of the nation's busiest: Washington Dulles International and Ronald Reagan Washington National;
- The Port of Virginia, with over 3,000 sailings annually;
- The Virginia Inland Port in Front Royal;
- The Port of Richmond;
- Virginia's 70,000 mile highway system including its major Interstate Highways; and
- Virginia's six foreign trade zones.

Keeping the system functioning will be the key to continued economic development success. Poor quality facilities, poor services, or inadequate capacity will signal a degradation of infrastructure and will trigger a decline in economic success. Adequate investment, sophisticated asset management to preserve the system, and congestion reduction will be important future determinants of the contribution of transportation to the economy.

MAJOR OPPORTUNITIES FOR FUTURE INITIATIVES

There are also opportunities for specific investments which have already emerged from analyses conducted for VTrans2035. The Statewide Freight Study, which is ongoing, provides a full analysis of freight bottlenecks, which if removed, will provide for future economic development. Table 1 shows the study's list of major truck bottlenecks.

Table 1 **Virginia's Major Truck Bottlenecks**

Region	Location
Southwestern Virginia	<ul style="list-style-type: none"> • I-77, from near Galax to WV • I-81, from Radford and east
Southeastern Virginia	<ul style="list-style-type: none"> • I-64, Norfolk through Newport News • I-264/I-664, Norfolk through Newport News • U.S. 460/U.S. 58/ U.S. 13, from Port through Suffolk County
Western Virginia	<ul style="list-style-type: none"> • I-81, Radford to Harrisonburg • I-64 through Charlottesville • U.S. 29 through Charlottesville • U.S. 220, Roanoke to I-64
Central Virginia	<ul style="list-style-type: none"> • I-95, Emporia and south • I-95, Petersburg to Doswell • I-95 through Fredericksburg • U.S. 460 Corridor • U.S. 17 through Fredericksburg
Northern Virginia	<ul style="list-style-type: none"> • I-95, Fredericksburg to Washington DC • I-495 Capital Beltway • I-66, Washington DC to Manassas/Gainesville • I-66, Front Royal to I-81 • I-81, below I-66 through Winchester

These are, of course, not all of the segments or locations where there are current problems or potential future problems. Remedying these major highway bottlenecks will foster freight services and passenger services and will allow further strong economic development. Without the elimination of bottlenecks, transportation can strangle the economy rather than spur the economy.

WHAT POTENTIAL INITIATIVES SHOULD GET PRIORITY IN VIRGINIA?

Two highly interrelated initiatives: (1) for economic analysis, and (2) for performance measurement and reporting, are very promising, and would build upon what Virginia is already undertaking.

Enhanced Economic Analysis Capabilities

VDOT is taking effective action under VTrans2035 to implement procedures that will fully incorporate economic concerns into its planning and investment decisions. In the future, VDOT will utilize the TREDIS economic analysis tool to meet the full range of VDOT's needs for economic analysis capabilities:

1. *Projects and Programs* – ability to evaluate the economic impacts of individual projects, groups of projects or entire programs, under alternative future scenarios;
2. *All Modes* - ability to assess economic impacts for each mode; so it can be used for highway, bus, rail, airport and marine port projects, as well as multimodal projects and inter-modal terminals;
3. *Freight and Passenger Impacts* – ability to distinguish freight impacts from passenger impacts so it can reflect differences in freight and passenger mix among airport, marine port, rail, road and bus-oriented projects and programs.
4. *Rural and Urban Impacts* – ability to assess market access, congestion, and connectivity impacts (by mode) so it can be used for rural, urban and corridor studies.
5. *Peak and Off-Peak Effects* – ability to account for seasonal or time-of-day differences in service levels and congestion so it can give benefit to projects that address special commuting and tourism needs.
6. *Transportation Efficiency and User Benefits* – ability to distinguish travel efficiency and user savings effects, so that transportation benefits can be compared to broader economic impacts.
7. *Economic Impact Analysis* –ability to distinguish economic development growth impacts related to access and productivity changes, and keep them separate from other societal impacts for use in economic and environmental impact statements.
8. *Benefit/Cost Analysis* – ability to provide benefit/cost analysis with alternative definitions of benefit and study area, so that results can be tailored to decision-making needs.

These capabilities should be disseminated across all modal agencies and will serve as the basis for incorporating economic development into transportation planning and decision making.

Performance Measurement and Reporting

Good performance measurement and forecasting will also be essential for sound planning and investment in Virginia's transportation infrastructure. Currently available performance measurement and forecasting tools and data are discussed briefly below by mode.

Highways - One of the established highway performance measurement tools is the Highway Economic Requirements System (HERS) model. HERS includes a benefit-cost estimation routine that captures some of the benefits of highway improvements, including reductions in delay, in travel time costs, and in operating costs. HERS provides such performance measures in response to both improvements in capacity and to improvements in pavement quality.

Rail and Public Transportation - The Virginia Department of Rail and Public Transportation (DRPT) has developed a tool to estimate the public benefit of rail and public transportation projects.

Ports - In 2008, the College of William and Mary developed a comprehensive economic impact study of the benefit of port operations. The U.S. Maritime Administration has developed a public-use model, known as PortKit, that estimates economic impacts and benefits.

Airports - The Virginia Department of Aviation's 2004 Virginia Airport System Economic Impact Study found that "Virginia public use airports, including Dulles International and Ronald Reagan Washington National airports, contributed a total economic impact of more than \$10.7 billion to the Virginia economy."

One of the recommendations of the ongoing freight study is that the Commonwealth build on these available tools to develop a set of next-generation tools that allow for the comprehensive, system-level multimodal evaluation of its freight performance. This effort to enhance performance should be extended across all modes.

APPENDIX: ECONOMIC DEVELOPMENT LESSONS FROM THE UNITED KINGDOM

The European Lessons paper identified several areas from which the Commonwealth could learn from European experience, including the use of economic impact analysis in the United Kingdom. The United Kingdom's *Eddington Transport Study* (2006) identifies seven micro-economic drivers through which transport investment drives economic performance and which are beyond the parameters of benefit-cost but can be included in economic impact analysis. These are summarized as:

- Increasing business efficiency through time savings and improved reliability for business travelers, freight, and logistic operations;
- Increasing business investment and innovation by supporting economies of scale or new ways of working;
- Supporting clusters and agglomerations of economic activity;
- Improving the efficient functioning of labor markets, increasing labor market flexibility and the accessibility of jobs;
- Increasing competition by opening up access to new markets;
- Increasing domestic and international trade by reducing the costs of trading; and
- Attracting globally mobile activity by providing an attractive business environment and good quality of life.

Eddington evaluated these three types of overall economic analysis:

- The conventional benefit-cost ratio which refers to the measure conventionally used;
- The wider benefit-cost measure which would add on to traditional b/c the “missing” gross domestic product (GDP) productivity impacts on the economy, as identified above; and
- The value for money (VFM) assessment which adds in the missing GDP impacts plus the monetized estimate of the environmental costs and some social costs.

The Eddington report concludes that the last and broadest measure can be the most appropriate to use in evaluating transportation investments, and it shows how that measure can be used to evaluate a wide range of projects across modes and across investment purposes.

Recommendations of the Eddington report are now being implemented in the UK. They have also received significant attention by transportation professionals in the US.