



Appalachian Development Highway System
2012 Cost-to-Complete Report
October 2012



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October 2012

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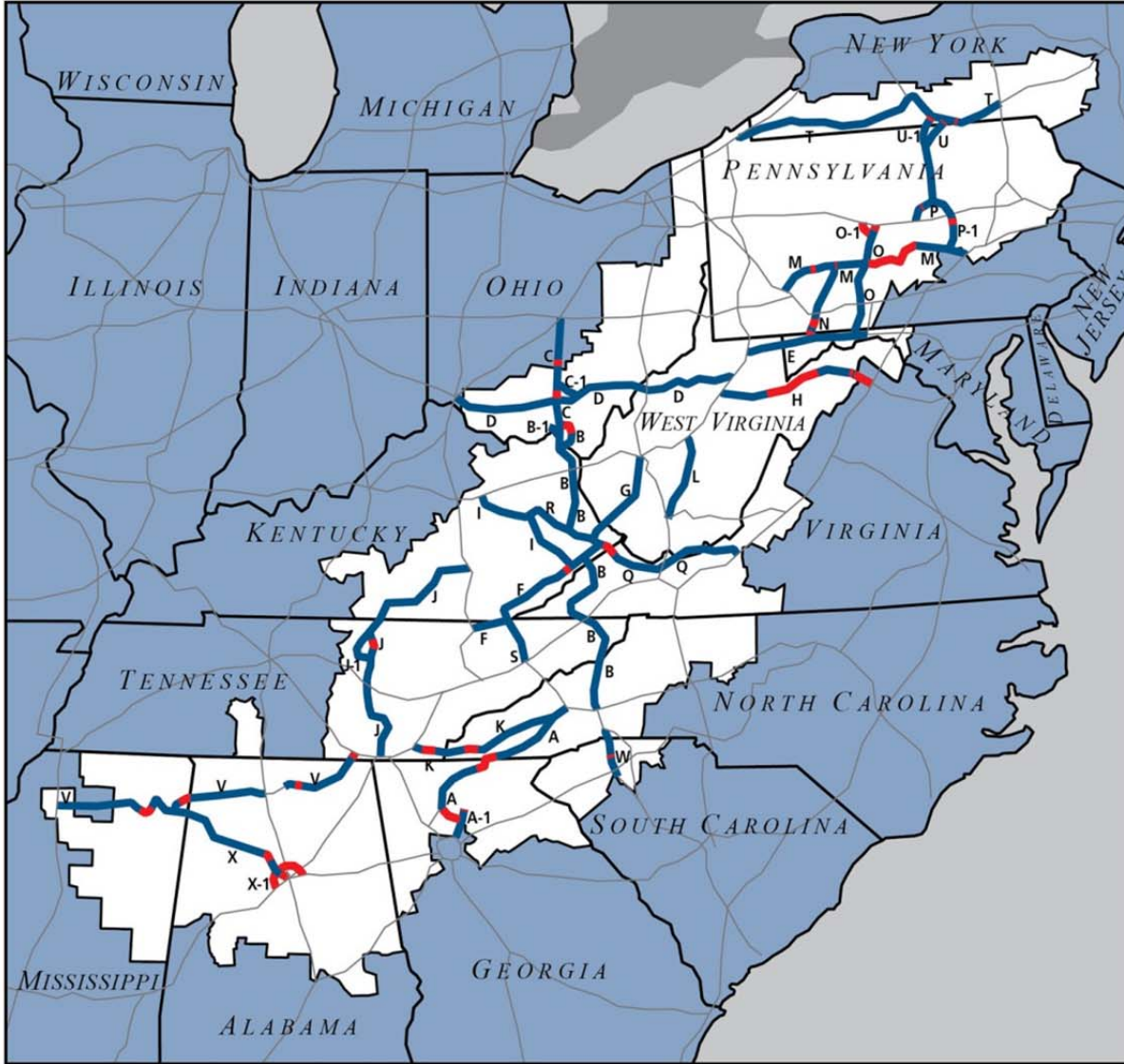
Federal Highway Administration, Office of Program Administration

The Nick J. Rahall Appalachian Transportation Institute (RTI), located at Marshall University, was responsible for developing and providing a web-based automated ADHS cost estimating system for state departments of transportation to use in preparing their 2012 ADHS cost-to-complete estimates. The Appalachian Regional Commission extends its sincere appreciation to RTI for their role in developing the ADHS 2012 Cost-to-Complete Estimate in a cost-efficient manner.



APPALACHIAN DEVELOPMENT
HIGHWAY SYSTEM

September 30, 2011



- ADHS Miles Open to Traffic
- ADHS Miles Not Open to Traffic
- Interstate Highway System

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INTRODUCTION

Congress created the Appalachian Regional Commission (ARC) in 1965 to facilitate economic and social development in the Appalachian Region. The Appalachian Region is a 200,000-square-mile region that follows the spine of the Appalachian Mountains from southern New York to northern Mississippi. It includes all of West Virginia and parts of 12 other states: Alabama, Georgia, Kentucky, Maryland, Mississippi, New York, North Carolina, Ohio, Pennsylvania, South Carolina, Tennessee, and Virginia.

Recognizing the importance of an efficient transportation system to the Region's development, Congress established the Appalachian Development Highway System (ADHS) as the centerpiece of ARC's economic and social development programs. The ADHS was designed to connect Appalachia, both physically and economically, to the rest of the nation and to generate jobs across the Region.

The Appalachian Regional Development Act of 1965 authorized the construction of 2,350 miles of ADHS corridor highways. Since then, Congress has added 740 miles to the ADHS: 350 miles in 1967; 200 miles in 1975; 125 miles in 1978; and 65 miles in 2006. The 3,090 miles of ADHS highways that are now authorized for construction are fully contained within 32 designated corridors.

ARC has programmatic oversight over the ADHS program as well as responsibility for determining the corridor locations and termini. Individual states take the lead in planning, designing, constructing, and maintaining ADHS projects; the Federal Highway Administration (FHWA) is charged with the day-to-day oversight of the ADHS program. The Appalachian governors have placed a top priority on a modern highway system as the key to economic development. Today the ADHS is the backbone of ARC's cooperative regional approach to problem solving and of all other development efforts.

Recent Funding Authorizations

The Safe, Accountable, Flexible, and Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU) authorized \$470 million for the ADHS for each of the fiscal years 2005 through 2009, to cover 80 percent of the costs associated with constructing eligible ADHS miles. It directed these funds to be apportioned to the Appalachian states based on the most current ADHS cost-to-complete estimate. The funds remain available until expended.

In FY 2010, \$470 million was authorized for the ADHS through the Surface Transportation Extension Act of 2010 and apportioned as defined in SAFETEA-LU.

In FY 2011, \$517,796,946 was authorized for the ADHS through the Surface Transportation Extension Act of 2010, as amended by the Surface Transportation Extension Act of 2010 Part II, and the Surface Transportation Extension Act of 2011.

In FY 2012, \$438,776,680 was authorized for the ADHS pursuant to the Surface Transportation Extension Act of 2011, Part II, as amended.

In July 2012, Congress changed the way the ADHS is funded. The transportation law Moving Ahead for Progress in the 21st Century (MAP-21) includes ADHS funding as part of the larger Surface Transportation Program (STP). Under MAP-21, STP funds are apportioned to the Appalachian states, with each state using the funding at its own direction. The law also increases the federal share of funding for ADHS corridors and access roads from 80 percent to 100 percent. The 100 percent federal share applies to funds apportioned to the ADHS in prior years and new funds apportioned to the states and used for ADHS construction. The Authority for 100 percent federal funding extends from FY 2012 through FY 2021.

A Sense of the Senate provision in the legislation stated that “the timely completion of the Appalachian Development Highway System is a transportation priority in the national interest.” Underscoring the interest of the Congress in prioritizing the completion of the ADHS is another provision in MAP-21 that requires each of the Appalachian states to establish, within one year, a plan to finish the construction of its designated corridors.

ADHS Benefits

Completed portions of the ADHS corridors have been instrumental in creating new jobs, increasing productivity, and making health care and education accessible to the people of Appalachia. A 1998 economic study of completed ADHS corridors found that every dollar invested in the ADHS yielded, on average, \$1.32 in economic development benefits (as measured by jobs, wages, and production) as well as \$1.18 in travel efficiencies (reductions in travel time, operating costs, and number of accidents).

A recent study on the economic impact of completing the ADHS estimated the economic development benefit-cost ratio for the Appalachian Region at 3.6, using a medium-growth scenario based on the most conservative, high-cost projections. The estimated return for the nation, using the same scenario, was \$3.00 for every \$1.00 invested. In addition, the study estimated the travel-efficiency benefit-cost ratio of completing the ADHS at 1.9 for the Appalachian Region and 2.9 for the nation as a whole, using the medium-growth scenario based on the most conservative, high-cost projections.

As of September 30, 2011, 80 percent of the 3,090 miles authorized for the ADHS were complete. Studies of completed segments indicate that the improvements on the ADHS can have significant impacts on the Region’s economy and on the safety of the traveling public. But the final miles of the system are among the most difficult and expensive to construct.

Despite the magnitude of the work remaining, the economic impetus to complete the system has never been more compelling. In today’s global marketplace, a modern system of highways is an essential first step toward fostering economic growth and enabling Appalachia to become a net contributor to the national economy. The Commission strongly supports the completion of the 32 corridors that make up the ADHS.

Cost-to-Complete Estimates

Every five years, ARC, in cooperation with the Federal Highway Administration (FHWA) and the state departments of transportation (DOTs), develops an estimate of the cost to complete the ADHS corridors. The last cost-to-complete estimate, completed in 2007, found that as of

September 30, 2006, a total of 2,362.3 miles, or more than 76 percent of the 3,090 ADHS miles authorized by Congress, were complete; 144.3 miles were open to traffic with stage construction remaining; 128.9 miles were in the construction stage; and 454.6 miles were in either the location stage or the design stage.

In this context, ARC in 2012 undertook a full-scale study of the cost to complete the ADHS, the first formal estimate since 2007. The purpose of the ADHS 2012 Cost-to-Complete Estimate was to determine the level of federal funding needed to complete the system. In addition, the cost-to-complete estimate will be used to provide information to key decision-makers regarding ADHS progress.

METHODOLOGY

This cost estimate is based on the cost to complete the authorized 3,090 miles of ADHS highways. The estimate includes all remaining work on eligible sections of the ADHS not obligated as of September 30, 2011, including engineering, right-of-way acquisition, environmental mitigation, and construction.

All activities included in the estimate are consistent with policies, highway standards, and specifications and guides currently used for typical federal-aid highways. The state estimates were based on the most recently approved design features, corridor locations, and estimates of quantities needed for construction as of September 30, 2011. All costs are in 2010 dollars.

Only ADHS projects not authorized as of September 30, 2011, are included in the estimate, with the exception of prefinanced projects. (Prefinanced projects are ADHS projects that use non-ADHS funds—federal and/or state—to accelerate ADHS completion and have been approved for reimbursement when ADHS funds become available.) Estimates assume that all authorized ADHS work, including under-runs and over-runs, has been accomplished. Cost estimates for corridor sections that did not have location approval as of September 30, 2011, were based on the locations used in the ADHS 2007 Cost-to-Complete Estimate.

The cost estimating process was undertaken in coordination with the Federal Highway Administration (FHWA). ARC, FHWA, and the state departments of transportation (DOTs) worked together to prepare an accurate estimate in a consistent and efficient manner. Estimates were developed by each of the 13 Appalachian states in accordance with the *Guidelines and Software Instruction Manual for Preparation and Submission of the Appalachian Development Highway System 2012 Cost to Complete Estimate*, which provided instructions and outlined requirements to ensure consistency among state estimates. A training session on the use of the manual was conducted for the state DOTs and FHWA representatives responsible for preparing and reviewing the state ADHS cost-to-complete estimates. In addition, ARC worked with the Nick J. Rahall II Appalachian Transportation Institute at Marshall University to develop an Internet-based system for state DOTs to use in preparing and submitting their cost estimates. The system gave ARC and FHWA simultaneous access to data for review, analysis, and verification of the estimates.

In preparing their estimates, state DOTs used estimating processes consistent with those used for other projects in a similar state of development. FHWA, through its state division offices,

reviewed the state cost estimates to validate procedures and results. Each state’s DOT chief executive and FHWA state division administrator certified that the state’s ADHS 2012 cost-to-complete estimate had been developed according to prescribed guidelines.

STATUS OF COMPLETION

As of September 30, 2011, a total of 2,716.4 miles, or 88 percent of the 3,090 miles authorized for the ADHS, were open to traffic or under construction. All eligible work has been completed on 2,488.6 of those miles; stage construction work, such as adding interchanges, additional lanes, second-stage pavement, and rest areas, is required on the remaining 154.3 miles. In addition, 73.5 miles were in the construction phase; 130.9 miles were in the design phase, and 242.8 miles were in the location phase. (See table 1 below and figures 1 and 2 on page 5.)

Since the ADHS 2007 Cost-to-Complete Report, 136.3 miles of ADHS highways have been opened to traffic (net increase).

Table 1. Status of Completion of the ADHS (Miles)
(as of September 30, 2011)

State	Total Miles Eligible for ADHS Funding	MILES NOT OPEN TO TRAFFIC			MILES OPEN TO TRAFFIC	
		Location Study Needed or Under Way	Design and/or Right-of-Way Under Way	Construction Under Way	Remaining Stage Construction	Complete
Alabama	295.7	62.5	4.4	17.8	58.6	152.4
Georgia	132.5	20.5	11.1	0.0	0.0	100.9
Kentucky	426.3	0.0	22.1	6.5	0.0	397.7
Maryland	83.2	2.5	0.0	0.0	3.7	77.0
Mississippi	117.5	0.0	8.3	9.8	0.0	99.4
New York	222.0	0.0	1.1	8.6	0.7	211.6
North Carolina	204.3	18.1	0.0	2.8	8.0	175.4
Ohio	201.5	7.1	16.2	0.0	0.0	178.2
Pennsylvania	453.1	87.4	25.9	0.0	2.9	336.9
South Carolina	22.9	0.0	0.0	4.3	0.0	18.6
Tennessee	329.3	14.1	3.4	6.3	78.3	227.2
Virginia	192.2	15.3	13.4	1.6	1.2	160.7
West Virginia	409.6	15.3	25.0	15.8	0.9	352.6
Total	3,090.0	242.8	130.9	73.5	154.3	2,488.6

Notes: Totals may not add because of rounding. Table updated May 2012.

Figure 1. Status of Completion of the ADHS: Percentage of Miles in Each Stage of Development
(as of September 30, 2011)

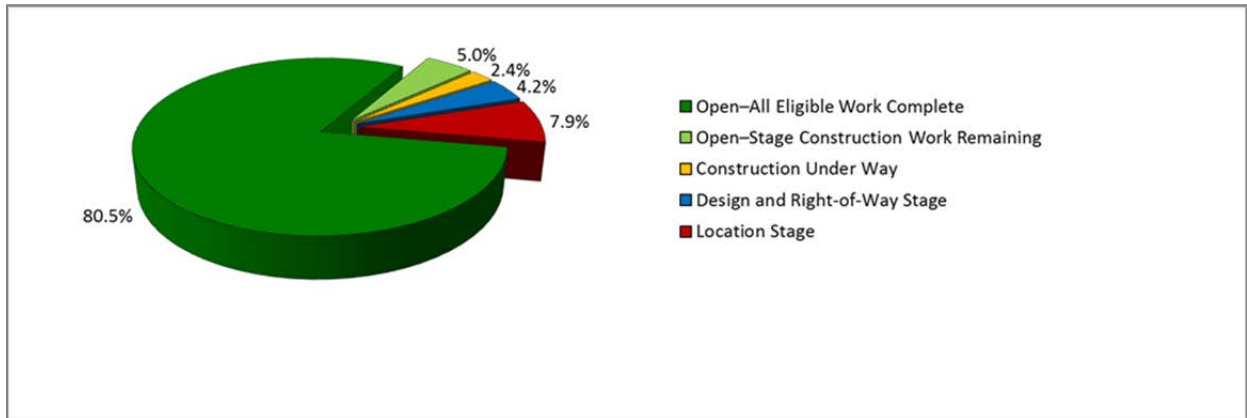
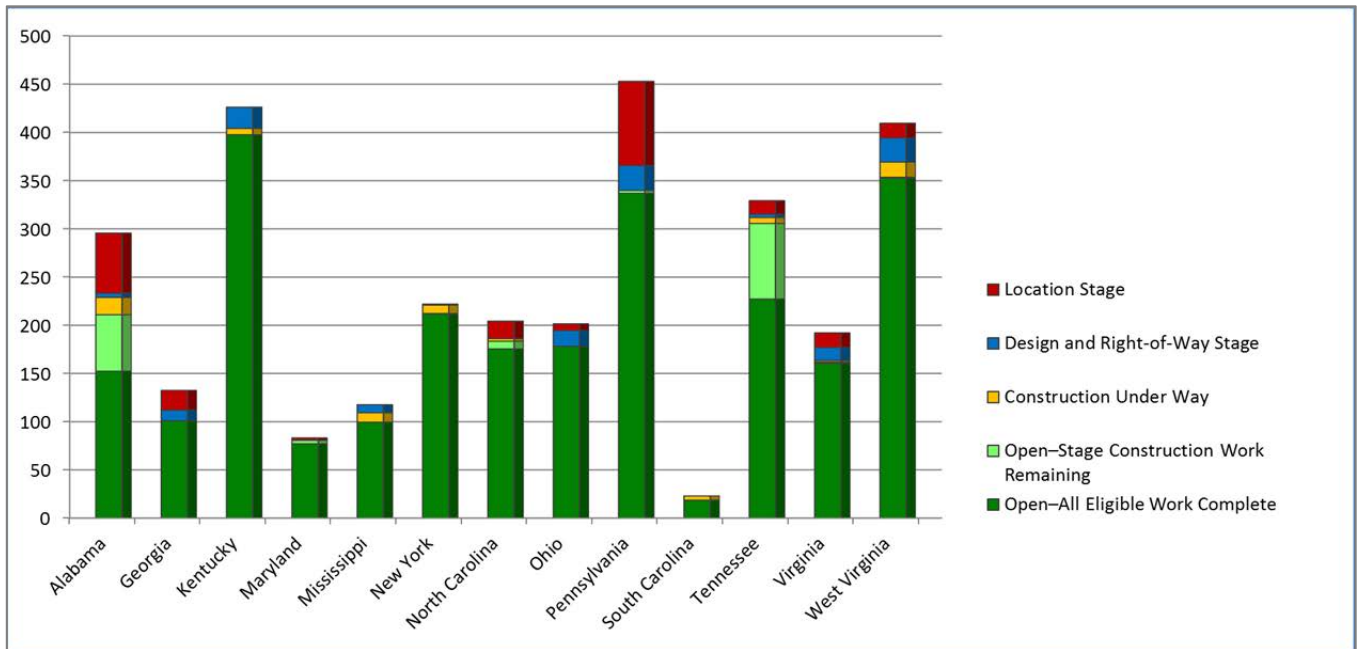


Figure 2: Status of Completion of the ADHS: Number of Miles in Each Stage of Development, by State
(as of September 30, 2011)



COST TO COMPLETE THE ADHS AND REMAINING NEEDS

The 2012 total estimated cost to complete the ADHS, as of September 30, 2011, is \$11.4 billion, including \$32 million in prefinanced projects. As of September 30, 2011, there was \$2.3 billion in federal funding available for the ADHS.

Table 2 below shows the cost to complete each state's ADHS corridors and remaining funds needed.

Table 2. Cost to Complete the ADHS, by State
(as of September 30, 2011)

State	Cost to Complete ADHS Corridors	Available Funds	Remaining Funds Needed	Percentage of Total Remaining Funds Needed
Alabama	\$3,254,690,000	\$204,550,007	\$3,050,139,993	35.66%
Georgia	408,029,000	239,214,917	168,814,083	1.97%
Kentucky	812,416,000	137,929,479	674,486,521	7.89%
Maryland	289,647,000	101,578,621	188,068,379	2.20%
Mississippi	30,978,000	7,285,146	23,692,854	0.28%
New York	38,366,000	47,738,522	0	0.00%
North Carolina	823,195,000	284,412,016	538,782,984	6.30%
Ohio	459,655,000	130,430,317	329,224,683	3.85%
Pennsylvania	3,160,092,000	571,721,016	2,047,713,984*	23.94%
South Carolina	0	26,329,919	0	0.00%
Tennessee	701,207,000	308,849,967	392,357,033	4.59%
Virginia	582,706,213	172,657,727	410,048,486	4.79%
West Virginia	830,215,974	100,679,866	729,536,108	8.53%
Total	\$11,391,197,187	\$2,333,377,520	\$8,552,865,108*	100%

* Remaining funds needed reflects federal funding limitations on Corridors O-1 and P-1 in Pennsylvania.

FACTORS AFFECTING THE COST OF REMAINING WORK

The estimated cost of completing the ADHS decreased from \$11.8 billion in the ADHS 2007 Cost-to-Complete Estimate to \$11.4 billion in the ADHS 2012 Cost-to-Complete Estimate.

Factors affecting the 2012 cost estimate include the following:

- **Inflation.** Nationwide, highway construction costs have increased an average of 15 percent since the ADHS 2007 Cost-to-Complete Estimate.
- **Cost Refinements.** As highway projects progress through the stages of development (location, design/right of way, and construction), earlier estimates are refined and updated to reflect changing specifications and costs for construction, right of way, environmental mitigation measures, and design standards. Estimating costs for highway miles in the location phase is particularly challenging, as final alignments have not yet been determined, and engineering requirements such as fills and number and types of bridges are not known at that stage.

ADHS UNOBLIGATED BALANCES

In order to determine the remaining federal funding needed to complete the ADHS, an inventory of each state’s unobligated ADHS funds from all federal sources (TEA-21, SAFETEA-LU, earmarks, and special U.S. DOT appropriations) was developed. The inventory showed that as of September 30, 2012, a total of \$1,848,069,279 in ADHS funding was unobligated.

Table 3. ADHS Unobligated Balances
(as of September 30, 2011)

State	Unobligated Balance
Alabama	\$98,211,445
Georgia	\$146,632,531
Kentucky	\$109,998,401
Maryland	\$79,916,135
Mississippi	\$12,570,847
New York	\$47,149,667
North Carolina	\$255,356,132
Ohio	\$109,756,135
Pennsylvania	\$464,575,113
South Carolina	\$19,799,541
Tennessee	\$285,646,452
Virginia	\$137,211,744
West Virginia	\$81,245,136
Total	\$1,848,069,279

ECONOMIC IMPACT OF COMPLETING THE ADHS

Studies undertaken to evaluate the impact of ADHS corridors on economic development and highway safety have demonstrated the clear benefits of these corridors for the Region.

Analysis of the Economic Contributions of Completed Sections of the ADHS

In 1998, Wilbur Smith Associates conducted an economic study that focused on the contributions of completed sections of 12 ADHS corridors in 165 counties (of the 399 counties in the Appalachian Region at the time) to economic development and the quality of life of the Region’s citizens. The study quantified the impact of the sections on economic development (as measured by jobs, wages, and production) and travel efficiencies (reductions in travel time, operating costs, and number of accidents) by estimating the difference between what had occurred in counties with completed ADHS sections and what would have occurred in those counties without the ADHS sections. The study found that every \$1.00 invested in the ADHS yielded, on average, \$1.32 in economic development impacts and \$1.18 in travel efficiencies.

Assessment of the Economic Benefits of Completing the ADHS

A study of the economic impact of the ADHS conducted for ARC in 2007 by Cambridge Systematics and Economic Development Research Group assessed the economic benefits of completing the remaining segments of the ADHS. The study assessed the travel performance,

trade, and economic development impacts directly related to completing the ADHS. In addition, it assessed connectivity, accessibility, and network effects—how corridor improvements connect Appalachian people and businesses to other highway facilities, multi-modal transportation, and economic markets (labor force, buyers and suppliers, and tourists). The study was released in 2008.

There are a number of key differences between the 1998 study and the 2008 study, including the following: 1) the 1998 study examined benefits from 12 already-completed highway segments rather than estimating benefits of the future completion of the ADHS; 2) similarly, the 1998 study was based on an analysis of individual highway segments, while the 2008 study emphasized the network benefits of a complete highway system; 3) the 2008 study made use of national freight flow data not previously available, which allowed for a more complete capture of national freight system benefits; and 4) the new study estimated an additional benefit not previously examined—the potential for economic development benefits due to improved market access to labor force, buyers, suppliers and multimodal facilities.

Key findings from the 2008 study include the following:

Travel Efficiency Benefits

Completing the ADHS will result in significant travel benefits, including lower travel times and costs for businesses and individuals both inside and outside of Appalachia. Nationally, total user benefits (savings in travel time, fuel and non-fuel operating costs, and increased safety) are estimated to be \$1.6 billion annually by the year 2020—the hypothesized year of system completion—and to grow to \$5.1 billion annually by 2035 under a medium-growth scenario.

Completing the ADHS has national significance: it will facilitate the movement of freight into, out of, and through the Region. More than 65 percent of the benefits of freight flows will accrue to areas outside the Appalachian Region.

Completing the ADHS will result in a significant reduction in travel time for business and personal trips, as well as for long-distance freight trips. By 2020, the aggregate savings in travel time are estimated to be over 84 million hours annually, growing to almost 212 million hours by 2035.

Direct Economic Benefits

The Appalachian Region will gain an estimated \$2.1 billion annually in value-added activity by 2035 due to economic development effects from market accessibility gains.

Completing the ADHS will result in improved market accessibility for large segments of the Appalachian Region. Three hundred twenty-five of the 410 Appalachian counties will benefit from improved accessibility to buyer and supplier markets within a 3-hour drive.

Total Economic Impacts

Reduced business-related travel time and costs, along with increased regional growth made possible by market accessibility gains and associated multiplier effects (supplier and consumption effects and induced effects on regional output and employment) will directly impact the economy of the Appalachian Region. These regional impacts will gradually increase

over time and by 2035 will generate an estimated 80,500 jobs and \$3.2 billion in increased wages for the Region's workers, as well as a total of \$5.0 billion in increased economic activity (as measured by value added).

Benefit-Cost Analyses of Travel Efficiency and Economic Growth Impacts

Two benefit-cost analyses were examined in the study: one on travel efficiency for the Region and the nation, and one on economic growth impacts for the Region and the nation. While costs were the same in each, the benefits varied: travel efficiency benefits were higher for the nation than for the Region, while economic growth impacts, resulting from increased market access, were greater for the Region than for the nation, reflecting the attainment of the systems' strategic development goal.

The estimated travel efficiency benefit-cost ratio of completing the ADHS, using a medium-growth scenario based on the most conservative, high-cost projections, was 1.9 for the Appalachian Region, and 2.9 for the nation as a whole. The estimated economic growth impacts benefit-cost ratio, using the same scenario, was 3.6 for the Appalachian Region and 3.0 for the nation as a whole. Thus, the estimated return for the nation as a whole is \$3.00 for every \$1.00 invested in completing the ADHS.

ADDING CAPACITY TO THE INTERSTATE SYSTEM

The ADHS has been instrumental in adding capacity to the nation's interstate system. A number of ADHS corridors are currently designated as interstate highways:

- Corridor B (Interstate 26) in North Carolina and Tennessee;
- Corridor E (Interstate 68) in Maryland and West Virginia;
- Corridor O (Interstate 99) in Pennsylvania;
- Corridor P (Interstate 180) in Pennsylvania;
- Corridor T (Interstate 86) in Pennsylvania and New York;
- Corridor U-1 (Interstate 99) in Pennsylvania and New York;
- Corridor V (Interstate 22) in Mississippi; and
- Corridor X (Interstate 22) in Alabama and Mississippi.

LOOKING AHEAD

The provisions of MAP-21 present an important opportunity for the completion of the ADHS. By increasing the federal share of funding on ADHS corridors to 100 percent, the law enables the Appalachian states to plan, design, and construct ADHS corridors without relying on state funds, and will free up state funds for other projects. The law also makes \$2.3 billion in unobligated funds available to the states at 100 percent federal share.

The economic impetus to complete the ADHS has never been more compelling. In today's global marketplace, a modern system of highways is essential for economic growth and for enabling Appalachia to become a net contributor to the national economy.

ARC strongly supports the completion of the ADHS corridors.