



# Strengthening Connections Between Transportation Investments and Economic Growth

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January 21, 2011

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# Author Biographies

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**Douglas Holtz-Eakin** has a distinguished record as an academic, policy adviser, and strategist. Currently he is the President of the American Action Forum and a Commissioner on the Congressionally-chartered Financial Crisis Inquiry Commission. Since 2001, he has served in a variety of important policy positions.

During 2001-2002, he was the Chief Economist of the President's Council of Economic Advisers (where he had also served during 1989-1990 as a Senior Staff Economist). At CEA he helped to formulate policies addressing the 2000-2001 recession and the aftermath of the terrorist attacks of September 11, 2001. From 2003-2005 he was the 6th Director of the non-partisan Congressional Budget Office, which provides budgetary and policy analysis to the U.S. Congress. During his tenure, CBO assisted Congress as they addressed numerous policies. Notably the 2003 tax cuts (JGTRRA), the Medicare prescription drug bill (MMA), and Social Security reform. During 2007 and 2008 he was Director of Domestic and Economic Policy for the John McCain presidential campaign. Since the 2008 election Dr. Holtz-Eakin was the President of DHE Consulting, an economic and policy consulting firm providing insight and research to a broad cross-section of clients.

Dr. Holtz-Eakin has held positions in several Washington-based think tanks. He was Senior Fellow at the Peter G. Peterson Institute for International Economics (2007-2008), and the Director of the Maurice R. Greenberg Center for Geoeconomic Studies and the Paul A. Volcker Chair in International Economics at the Council on Foreign Relations (2006). He has also been a visiting Fellow at the American Enterprise Institute, Heritage Foundation, and American Family Business Foundation.

Dr. Holtz-Eakin built an international reputation as a scholar doing research in areas of applied economic policy, econometric methods, and entrepreneurship. He began his career at Columbia University in 1985 and moved to Syracuse University from 1990 to 2001. At Syracuse, he became Trustee Professor of Economics at the Maxwell School, Chairman of the Department of Economics and Associate Director of the Center for Policy Research.

Dr. Holtz-Eakin serves on the Boards of the Tax Foundation, National Economists Club and Center for a Responsible Federal Budget, and the Research Advisory Board of the Center for Economic Development.



**Martin Wachs** is a senior principal researcher at the RAND Corporation. He formerly served as director of the Transportation, Space and Technology Program. Prior to joining RAND in 2005, he was professor of civil and environmental engineering and professor of city and regional planning at the University

of California, Berkeley, where was also director of the Institute of Transportation Studies. Prior to this, he spent 25 years at UCLA, where he served three terms as chairman of the Department of Urban Planning.

Wachs is the author of 160 articles and four books on subjects related to relationships between transportation, land use, and air quality; transportation needs of the elderly; techniques for the evaluation of transportation systems; and the use of performance measurement in transportation planning. His research also addresses issues of equity in transportation policy, problems of crime in public transit systems, and the response of transportation systems to natural disasters, including earthquakes. His most recent work focuses on transportation finance in relation to planning and policy.

Wachs served on the Executive Committee of the Transportation Research Board for nine years and was the TRB Chairman in 2000. He received a Guggenheim Fellowship, two Rockefeller Foundation Humanities Fellowships, a UCLA Alumni Association Distinguished Teaching Award, the Pyke Johnson Award for the best paper presented at an annual meeting of the Transportation Research Board, and the Carey Award for service to the TRB. In 2006 he was named "Member of the Year" by the San Francisco Chapter of the Women's Transportation Seminar.

# Table of Contents

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Executive Summary ..... 1

Introduction ..... 5

The Need to Focus on Long-Term Returns from Public Investments ..... 9

Job Creation and Public Investment in the Current Policy Context ..... 13

The “Multiplier” as a Method for Estimating Job Impacts ..... 19

Conclusions and Recommendations ..... 23



Transportation infrastructure investment programs are not all equally effective at creating jobs or economic growth.



# Executive Summary

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As the 112th Congress grapples with the need to reauthorize highway legislation, debate about federal transportation policy and transportation spending is likely to reflect two competing priorities—the need for new investment and creation of jobs, and concern for the exploding national debt. America’s transportation facilities are in need of substantial investment and Americans are in need of jobs, but we are increasingly relying on borrowed funds to pay for federal transportation investments. How can we chart a national direction to address critical infrastructure needs while generating real jobs benefits? This is both more consequential and more challenging than at any time within memory.

This paper elaborates upon and deepens the ongoing policy discussion of relationships between investments in transportation infrastructure and the nation’s short- and long-term economic well-being. Transportation infrastructure investment programs are not all equally effective at creating jobs or economic growth. Poorly targeted transportation dollars represent a wasted opportunity that the country can ill afford given its current fiscal predicament. On the other hand, accelerating the return of robust and sustained economic expansion will be imperative and can be advanced by the sound investment of scarce resources.

Different types of expenditures on transportation can have very different long-term economic and short-term jobs impacts. While there is great interest in short-term job creation during a deep recession, it is also important to focus on longer-term impacts. Federal legislation should focus future spending on surface transportation in ways that reach well beyond the immediate creation of construction jobs to capture broad, sustainable economic benefits.

This paper analyzes three key issues related to transportation investment, jobs, and economic growth:

- **The need to focus on returns from public investments.** Short-term job creation, while vitally important, must be viewed within the context provided by a longer-term view. Over the long-term, higher productivity—the ability to generate more output and income from each dollar of capital or hour of work—is the key to higher labor earnings and improved standards of living. While transportation investment always “creates jobs,” its net effect on workers and the economy as a whole will be positive *only* if government transportation investments are rigorously selected to meet productivity criteria.

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## How can we chart a national direction to address critical infrastructure needs while generating real jobs benefits?

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- **Job creation and public investment in the current policy context.** In the context of an untenable federal fiscal posture, comprehensive and strategic reforms that clearly identify the federal role in transportation and target funds toward genuinely high-value transportation projects will be essential. Simply assuming that any transportation investment will have positive stimulative effects and will produce long-term gains for the economy is not a sound basis for investment. We need to do a better job of systematically evaluating alternative investments so as to better distinguish among their different outcomes and so as to improve the returns to public investment in an era of unprecedented budget pressures and increasingly constrained government resources.

- **The “multiplier” as a method for estimating job impacts.** Spending on transportation is often justified on the basis of jobs impacts, but estimated multiplier effects carry substantial uncertainty. Generally, they are not purely data-driven; rather they rely on judgments and assumptions, may not take into account aspects of the structure or timing of an investment that would have an impact on its actual multiplier effects, and may miss qualities of the specific economic environment in which an investment is being made. These uncertain estimates about how many jobs will be created by a given increment of transportation spending too often obscure meaningful comparative assessment of different investment opportunities.

Well-targeted transportation investments can deliver long-term benefits in terms of improved efficiency and productivity by reducing costs associated with congestion, environmental damage, and accidents. At the same time they can also create employment opportunities in the short-term and contribute to the nation’s economic recovery. To achieve these outcomes, however, our nation must approach transportation spending differently than in the past. We recommend the following policy changes:

- 1) **Borrowed funds should not be put into existing channels for transportation spending in an effort to increase short-term employment.** We should not put any money—much less borrowed money—into programs that provide questionable job-creation and long-term economic benefits.
- 2) **Funding for transportation infrastructure that is intended to create jobs should focus on investments that are “shovel-ready” AND provide long-term benefits.** These are the investments that can help ease immediately unemployment while also building our economic future.
- 3) **Federal transportation policy should be flexible on the “how” while being specific about outcomes.** We need to focus more on accountability for the specific outcomes we want to achieve—economic growth, job creation—rather than on the strategies used to achieve them.





The task of charting a national direction to address critical infrastructure needs while generating real jobs benefits is more consequential and more challenging than at any time in the recent past.



# Introduction

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As the 112th Congress grapples with the need to reauthorize highway legislation, debate about federal transportation policy and transportation spending is likely to reflect the two profound and often competing priorities that have increasingly come to dominate the nation's political discourse. On one hand there is wide support for the proposition that America needs to make new investments—both to sustain its still fragile recovery from the worst economic crisis since the Great Depression and to provide the foundation for sustained competitiveness and prosperity in the long run. There also is intense concern about the exploding national debt and the nation's increasingly untenable longer-term fiscal outlook. This concern is already creating pressure to cut public spending across the spectrum of government programs.

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## Short-term job creation has always figured prominently in proposals for increased transportation spending.

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Few areas of national policy reflect these tensions more concretely than transportation. On one hand, the need for investment is clear: America's highways are deteriorating and increasingly congested. New road and rail capacity has not kept up with population growth or with the steady rise in goods movement. And critical facilities and systems have increasingly fallen behind in their capacity to meet demands being placed on them. Moreover, just as transportation system performance has clear links to longer-term economic growth, transportation system investment has a clear link to short-term economic stimulus. Transportation projects were among the most visible recipients of stimulus funds under the American Recovery and Reinvestment

Act of 2009. Indeed, short-term job creation has always figured prominently in proposals for increased transportation spending.

Both short- and long-term economic benefits are cited in the Administration's current proposal for a new round of investment in transportation infrastructure.<sup>1</sup> But even as the recent recession has led to calls for increased investment, actually finding the resources has become steadily more difficult. Notwithstanding the short-term boost provided by stimulus legislation in 2009, federal budgets going forward will be more constrained than ever and the budget situation at the level of state and local government is in many cases even more difficult. Meanwhile, the primary federal funding mechanism for transportation—the Highway Trust Fund—is increasingly seen as inadequate to finance the system's needs, and is also disconnected from transportation system performance objectives. In the current economic and political environment with deep resistance to new taxes or other revenue-raising measures, and a shifting political balance in the Congress, the task of charting a national direction to address critical infrastructure needs while generating real jobs benefits is more consequential and more challenging than at any time in the recent past.

This paper elaborates upon and deepens the ongoing policy discussion of relationships between investments

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<sup>1</sup> Specifically, President Obama has advocated a plan to renew and expand America's infrastructure. The plan includes \$50 billion in near-term investment connected to a six-year reauthorization of the surface transportation program. The Department of the Treasury and the Council of Economic Advisers have expressed support for this plan, stating that this is an optimal time to increase national investment in transportation infrastructure. The Administration's plan argues that (1) well designed infrastructure investments have long-term economic benefits; (2) the middle class will benefit disproportionately from this investment; (3) there is currently a high level of underutilized resources that can be used to improve and expand our infrastructure; and (4) there is strong demand by the public and businesses for additional transportation infrastructure investments.

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**Transportation investments can have a more significant and lasting impact on jobs by providing a foundation for overall economic growth and improved productivity well into the future.**

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in transportation infrastructure and the nation's short- and long-term economic well-being. Transportation infrastructure investment programs is surely not all equally effective at creating jobs or economic growth, so it is important to refine the debate. On one hand, poorly targeted transportation dollars represent a wasted opportunity that the country can ill afford given its current fiscal predicament. On the other hand, accelerating the return of robust and sustained economic expansion will be imperative and can be advanced by the sound investment of scarce resources. Good transportation policy can help prevent waste and promote real growth.

Different types of expenditures on transportation can have very different long-term economic and short-term jobs impacts—notwithstanding the tendency to invoke simplistic relationships in which a given level of investment are claimed to create a fixed number of jobs. For decades advocates for transportation investment have asserted that each billion dollars of transportation infrastructure investment would generate or “create” more than 30,000 jobs and thus be good for the economy. Such claims, though routinely asserted, are not well supported by evidence from rigorous analysis and at best represent a hope rather than an assured outcome. While elected officials and advocates often cite job figures in support of increased transportation spending, they rarely make clear that the numbers are based on

mathematical models, which in turn are heavily driven by so-called “multiplier” effects. The assumption is that money spent on highway construction, and closely associated goods and services such as the provision of supplies and materials, stimulates additional spending in the local and regional economy and that this spending in turn generates additional jobs.

In actuality employment impacts have been far more variable from one project to another, even when one considers only directly-related construction jobs. And while there is great interest in short-term job creation during a deep recession, it is also important to focus on longer-term impacts. Transportation investments can have a more significant and lasting impact on jobs by providing a foundation for overall economic

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**Hastily spending tens of billions of dollars on “shovel-ready” projects for the primary purpose of immediate job creation risks misallocating resources in ways that fail to maximize overall returns to the economy.**

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growth and improved productivity well into the future. By contrast, hastily spending tens of billions of dollars on “shovel-ready” projects for the primary purpose of immediate job creation risks misallocating resources in ways that fail to maximize overall returns to the economy.

Federal legislation should focus future spending on surface transportation in ways that reach well beyond the immediate creation of construction jobs to capture broad, sustainable economic benefits.

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This paper is organized as follows:

- The need to focus on long-term returns from public investments
- Job creation and public investment in the current policy context
- The “multiplier” as a method for estimating job impacts



A sense of urgency remains regarding the need to provide direction for both short-term spending and longer-term transportation policy reform.



# The Need to Focus on Long-Term Returns from Public Investments

Almost as soon as the Safe, Accountable, and Flexible Transportation Equity Act—A Legacy for Users (SAFETEA-LU) was passed in 2005, critics and stakeholders began calling for a substantial overhaul of federal transportation policy. The legislation was criticized as directionless and filled with “pork,” or at least with spending priorities that reflected political interests of individual members of Congress rather than carefully articulated national policy priorities. One project in particular, the infamous “Bridge to Nowhere,” did lasting harm by fostering widespread derision for the entire federal transportation program, even though it was but one of thousands of spending provisions in the bill. SAFETEA-LU also spent down the remaining balance of the Federal Highway Trust Fund without providing for new sources of revenue in the future. Given the widespread criticism directed at the 2005 legislation, it is perhaps ironic that so many political leaders embraced transportation spending as a key stimulus measure just three years later.

Recognizing that federal transportation policy was in need of reform, Congress established two separate commissions to recommend new policies for the sector, including new funding strategies adequate to support a sustainable national program.<sup>2</sup> Independent organizations, including the Bipartisan Policy Center (BPC), added their voices to the call for an overhaul of the structure and funding mechanisms for federal transportation investments.<sup>3</sup> BPC in particular issued a report in 2009 that articulated a long-term vision for federal transportation policy in which investments would be made in accordance with three national goals or objectives: economic

growth, energy and environmental sustainability, and safety. Progress in advancing those goals would be measured using a set of explicit performance metrics, which in turn would guide the allocation of resources.

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When the Highway Trust Fund ran out of money even before SAFETEA-LU expired in September 2009, Congress plugged the gap with general fund transfers. Congress has since provided two additional infusions from the General Fund—for a total of \$35 billion in deficit funding over less than two years. Further, with the expiration of SAFETEA-LU in 2009, the national program has been operating under a series of short-term extensions. Most recently, the President advocated for \$50 billion of additional infrastructure investments in FY 2011, described as a front-loaded “down payment” on a new surface transportation authorization bill that the Administration promises to introduce with its FY 2012 budget. John Mica (R-FL), the current Chairman of the House Committee on Transportation and Infrastructure, has indicated a desire to move a new authorization bill in the first part of 2011. A sense of urgency remains regarding the need to provide direction for both short-term spending and longer-term transportation policy reform, yet there is great uncertainty as to how these issues will evolve over the coming months. Just as there is growing pressure to expand and increase spending on transportation infrastructure to both contribute to economic recovery and deliver lasting economic returns, prospects for enacting the kinds of

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<sup>2</sup> Both commissions issued reports: “Transportation for Tomorrow: Report of the National Surface Transportation Policy and Revenue Study Commission,” 2007 and “Paying Our Way,” Report of the National Surface Transportation Infrastructure Financing Commission, 2009.

<sup>3</sup> “Performance Driven: A New Vision for Surface Transportation Policy.” Bipartisan Policy Center, 2009. See also “A Bridge to Somewhere: Rethinking American Transportation Policy for the 21st Century,” The Brookings Institution, 2008.

comprehensive policy reforms needed to realize those ambitious objectives are looking more doubtful.

Over the long-term, higher productivity—the ability to generate more output and income from each dollar of capital or hour of work—is the key to higher labor earnings and improved standards of living. Because higher productivity is so central to economic growth, it must be an explicit concern, rather than a presumed outcome based on increased spending, when Congress finally takes up a comprehensive authorization bill. At the same time, of course, Congress will need to address other long-term transportation-related objectives including safety, energy independence, and environmental sustainability. High-productivity transportation investments can generate improvements in economic well-being by increasing connectivity and reducing congestion. This represents a critical dimension of improving long-term employment, allowing labor to enhance its productivity at lower cost and encouraging private capital investments in structures, equipment, and technologies to reap higher returns from American industry. Of course, these investments also create direct employment opportunities—primarily in the construction industry—but this short-term job creation, while vitally important, must be viewed within the context provided by a longer-term view.

The test for a high-productivity public investment is that it should generate a rate of return to society that exceeds the market return in the private sector. The resources for any public transportation investment are ultimately drawn from the private sector through taxes and fees, or in some cases by borrowing from the private sector. In each case, the dollars used to make these investments constitute foregone opportunities to make other market investments. To meet a productivity test, transportation investments should have a greater impact in terms of raising future standards of living than other uses of funds as measured by the return on other

market investments. In addition, public sector transportation investments necessarily compete with other public sector investment opportunities. Thus, to ensure the best use of taxpayer dollars, government must channel funding to the projects that offer the highest returns to society. Often that means programs that do the most to enhance long-term productivity. While not every road, high-speed rail, or transit project can meet this test, a portfolio of well selected and thoughtfully targeted transportation investments can make a substantial contribution to aggregate economic productivity.<sup>4</sup>

A focus on high-productivity investments does not mean ignoring jobs impacts, rather it means shifting the emphasis to longer-term job creation. A more effective transportation network will draw jobs to related industries, including sea transport, warehousing, land transport, and so forth—jobs that, for the most part, will last much longer than short-term construction jobs. It is also important to understand, however, that any shift in resources creates losers as well as winners. A dollar spent on transportation means a dollar less to spend on other public investments or programs. In an environment of finite resources, funding transportation projects will create jobs, but at the expense of jobs that could have been created in other sectors had the money been used differently. This is why reform to direct government spending to the most productive investments is so crucial. While transportation investment always “creates jobs,” its net effect on workers and the economy as a whole—taking into account the benefits that will be foregone as a result of reduced public spending in other areas of the economy—will be positive only if government transportation investments are rigorously selected to meet productivity criteria.

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4 See, for example, “Economic Benefits of Transportation Investment”, *NCHRP Project 8-36, January, 2002* [http://www.transportation.org/sites/planning/docs/nchrp22\\_1.pdf](http://www.transportation.org/sites/planning/docs/nchrp22_1.pdf) or “How Infrastructure Investments Support the U.S. Economy: Employment, Productivity, and Growth”, *Political Economy Research Institute, January, 2009* [http://www.americanmanufacturing.org/wordpress/wp-content/uploads/2009/01/peri\\_aam\\_finaljan16\\_new.pdf](http://www.americanmanufacturing.org/wordpress/wp-content/uploads/2009/01/peri_aam_finaljan16_new.pdf)

Shifts in jobs occur not just across industries and sectors, but also across counties and states. Even a sub-optimal transportation investment is likely to be able to show positive employment impacts, especially in the short-term, from the perspective of the winning state or city. But from a national perspective and over time these gains could be—and often are—outweighed by losses elsewhere. A central recommendation of the BPC’s 2009 report was that federal transportation policy should guide federal dollars so as to produce a net gain for the economy as a whole over time, rather than for one area or region in the short-term. The construction of the Interstate Highway network, for example, created jobs near interstate interchanges as new and existing businesses were drawn to locations where they could take maximum advantage of the accessibility afforded by the new highway system. Towns that were bypassed by the Interstates, however, lost jobs as some of their businesses moved to these new locations and as other businesses that stayed “died on the vine” because they could no longer compete. Nevertheless, the federal investment creating the interstate highway network was justified because overall gains exceeded overall losses.<sup>5</sup>

As an example, if federal money were to be used to build a high-speed truck link between a port and a freight rail hub it might cut net delivery time to a region. The prospect of improved inventory management, increased sales, and other profits would then draw cargo to the port, increase port jobs, and expand employment related to the movement of goods on regional highways and increased business at the rail hub. At the same time, traffic to competing ports would likely decline, creating exactly the same chain reaction—in reverse.

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<sup>5</sup> Surely, it would be shortsighted to use federal dollars aggressively to build projects that strengthen some locales or business sectors at the expense of growth in others, though it may not be at all inappropriate for local or state entities to use their own resources to strengthen an area in competition with others. See Jonathan L. Gifford, “The Innovation of the Interstate Highway System,” *Transportation Research*, Part A, Vol. 18, No. 4 (July 1984), pp. 319-332.

Thus, employment losses at losing ports would, to some extent, offset employment gains at the winning port. The economy as a whole would be better off only if the increased productivity and costs savings from the port investment boosted overall activity such that benefits to the broader region and nation (some of which would likely translate to increased activity at other ports as well) exceeded the cost of the initial investment.

Conversely it is possible for transportation investments, judged by this standard, to be unproductive. A transportation policy driven by non-economic criteria will use government’s power to tax, charge fees, and borrow funds to divert resources to projects that are less productive relative to other investment opportunities available to the government or private sector. These projects also attract labor toward the affected sector and away from alternative private investments. Jobs are still created, but others are lost or foregone. In general, the economy as a whole loses when capital and labor shift to less productive economic uses. Returning to our earlier example, suppose the high-speed truck link is not built at the port where it could generate the greatest productivity gains, but instead politics dictate that the funds go to a region where there is no substantial intermodal traffic logjam. Taxes are raised (or debt is incurred) and spending is increased to support a project for which there is no corresponding net national benefit. While employment shifts to the region where the investment is made, employment opportunities in other regions fall. A regional competition for resources is not bad in and of itself, since it can spur all sides to make productivity improvements, but merely shifting resources from one region to another should not be the aim of national transportation policy unless the opportunity exists to generate net benefits in excess of net losses. That is precisely why building a “bridge to nowhere” will always represent a poor national investment even though it may, at least in the short run, benefit construction workers and others in the state where it is built.



In a fiscal environment that presents exceedingly difficult choices for all levels of government and all sectors of government activity, the challenge for transportation programs is clear.



# Job Creation and Public Investment in the Current Policy Context

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While a focus on productivity and net societal returns provides important guidance for federal transportation investments, the current economic and political context presents two important additional challenges for policy-makers: first, coping with daunting budget deficits for the foreseeable future and second, addressing sustained high unemployment in the aftermath of a severe recession.

## The Fiscal Environment

That the federal government's fiscal posture is untenable in the long run has been widely understood for some time. Successive versions of the *Long-Term Budget Outlook* put out by the Congressional Budget Office (CBO) show that absent major budget changes, the inexorable growth of existing entitlement programs and other government obligations will, over the next 30 years, raise federal outlays from about 20 percent of Gross Domestic Product (GDP) to between 30 and 40 percent of GDP.<sup>6</sup> In this context, continued spending while holding revenue flows to their post-war norm of 18 percent of GDP will quickly generate an unmanageable debt spiral. On the other hand, a rapid increase in taxes to match federal spending would likely also be self-defeating as it would cripple economic growth.

The basic contours of this looming fiscal crisis have been unchanged for a decade or more, but the most recent Administration budget shows that the problem has become dramatically worse in just the past few years. This means that severe consequences can be expected to emerge even more quickly. In fiscal year 2009, the federal government ran a deficit of \$1.4 trillion—the highest since World War II—as spending reached nearly 25 percent of GDP and receipts fell below 15 percent of GDP.

Going forward, there is no relief in sight. Over the next ten years, according to the CBO's analysis of the President's Budgetary Proposals for Fiscal Year 2011, the annual deficit will not fall below \$700 billion.<sup>7</sup> Ten years from now, in 2020, the projected deficit will reach 5.6 percent of GDP, or roughly \$1.3 trillion, of which more than \$900 billion will be devoted to servicing debt on previous borrowing. As a result, the nation's total debt in 2020 will have more than doubled since 2008—reaching 90 percent of GDP and still rising, according to the CBO forecast. Historically, a debt-to-GDP ratio of 90 percent or more is associated with the risk of a sovereign debt crisis. BPC's own Debt Reduction Task Force<sup>8</sup> has

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weighed in on the gravity of the situation and has developed a comprehensive set of difficult but necessary measures that could move the nation back to a sustainable fiscal path. These steps include reforming personal and corporate taxes to make America more competitive, ensuring that Social Security can pay benefits to future generations, and controlling health care costs. In addition, the federal government would need to freeze all or nearly all discretionary spending. In a fiscal environment that presents exceedingly difficult choices for all levels of government and all sectors of government activity, the challenge for transportation programs is clear.

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6 See, for example, Congressional Budget Office. *The Long-Term Budget Outlook*. Washington (DC): Congress of the United States; 2009 June.

7 Congressional Budget Office. *An Analysis of the President's Budgetary Proposals for Fiscal Year 2011*. Washington (DC): Congress of the United States; 2010 March.

8 Bipartisan Policy Center, *Restoring America's Future*, November, 2010

This is the case even though transportation programs have historically been financed to a greater extent by “user fees” than by general funds. Nevertheless, transportation spending has been deeply affected by the same trends that have contributed to the deterioration of the overall federal budget situation. Resistance to raising taxes has meant that federal taxes on gasoline and diesel fuel—at 18.4 and 24.4 cents per gallon, respectively—have not been raised since 1993.<sup>9</sup> Taking into account inflation, this means real tax rates have declined: in addition the purchasing power of the dollar, as measured by the consumer price index, has fallen by one-third over the same time period. Revenues raised through the gas tax have fallen still further relative to the actual demands placed on the nation’s highways as cars and trucks became more fuel efficient and thus traveled further on each gallon of gasoline or diesel fuel.<sup>10</sup> This means that Federal Highway Trust Fund revenues per mile driven have fallen dramatically since better fuel economy translates into fewer gallons of fuel purchased for the same amount of travel. With the combined effects of inflation and improved fuel economy, federal fuel taxes are no longer sufficient to cover the costs of the federal highway program. In 2008, Federal Highway Trust Fund revenues totaled \$36.4 billion but expenditures ran to \$49.2 billion. In

2009 revenues fell as expenditures rose. In fact, inflation-adjusted Federal Highway Trust Fund revenues from taxes on gasoline and diesel fuel fell to 30 percent below their peak in 1999.<sup>11</sup>

As the nation moves into an era of unprecedented budget pressures and likely severe fiscal austerity, transportation projects will necessarily compete with other priorities for scarce public funds. There may be growing pressure to divert traditional sources of revenue for transportation projects—even those that have generally been protected by “firewalls” and dedicated to transportation programs, such as the Highway Trust Fund—away from the purposes for which they were intended to contribute to general deficit reduction. At that point, having the “best” transportation project may no longer be enough. Rather, it will be necessary to demonstrate that spending on a particular transportation project is “better” or more justified than a competing outlay for health insurance, old-age income support, or other social needs.

## The Recession and Sustained High Unemployment

A second important challenge that will shape the surface transportation bill reauthorization debate is accelerating the nation’s recovery from a deep and prolonged economic recession, and in particular, addressing still high rates of joblessness throughout much of the country.

Two years of high unemployment have generated strong pressure to create jobs and have influenced the way policymakers think about transportation projects. While the U.S. economy is growing again, albeit slowly,

9 U.S. Department of Energy / Energy Information Administration (US DOE/EIA). Annual Energy Outlook. Report #:DOE/EIA-0383(2010), Washington, D.C., 2010. While estimating the revenue requirement for a sustainable transportation program is well beyond the scope of this paper, it is worth noting that an extremely broad consensus exists among analysts, stakeholders and advocates that an increase in fuel tax rates is needed. That this consensus exists is in itself remarkable, since it includes not only traditional advocates for transportation programs such as AASHTO and ARTBA, but notably also includes the U.S. Chamber of Commerce and the President’s Debt Reduction Task Force. See also a recent Joint Statement by BPC’s NTPP and members of the Financing Commission at <http://bipartisanpolicy.org/library/national-transportation-policy-project/joint-statement-undersigned-members-national-surface->

10 Fuel efficiency for new cars has increased from an average of 24.3 miles per gallon in 1980 to 32.6 miles per gallon in 2009. Source: Bureau of Transportation Statistics: [http://www.bts.gov/publications/national\\_transportation\\_statistics/html/table\\_04\\_23.html](http://www.bts.gov/publications/national_transportation_statistics/html/table_04_23.html)

11 Office of Management and Budget, “Table 2.4—Composition of Social Insurance and Retirement Receipts and of Excise Taxes: 1940–2015,” <http://www.whitehouse.gov/sites/default/files/omb/budget/fy2011/assets/hist02z4.xls>

and while economists predict that unemployment rates will *eventually* fall as market conditions improve and business output increases, assurances of long-run recovery provide scant comfort to millions of Americans who have been unable to find work for months and even years. For many of these workers and their families the current sluggish pace of recovery threatens to dramatically alter their circumstances, leaving some of them to cope with the prospects of a permanently reduced standard of living. Federal intervention, on the other hand, can help speed up the recovery. By stimulating increased demand for goods and services through tax cuts or direct spending programs, the government can accelerate the return to more normal levels of employment.

Ideally, there is an approach to transportation investment that can advance both goals: long-term productivity gains and shorter-term job creation. And clearly government should, whenever possible, choose projects that are both (a) beneficial from a long run productivity perspective and (b) able to be undertaken quickly enough to provide an immediate economic stimulus and create jobs. A high-productivity project that can be implemented quickly (“shovel-ready”) represents a clear “win-win” opportunity. So, for example, building a high-speed freight highway to connect a congested port to a rail hub during a recession would likely be a win-win investment. It would provide net long-term economic benefits, and the immediate construction jobs created as a result of funding the project would represent an added benefit during a period of high joblessness. Of course, the fact that a project is “shovel-ready” does not mean it will produce lasting economic benefits. Just about any project will generate some short-term job impacts, but far fewer projects are good investments from the standpoint of boosting long-term productivity and growth.

Conversely, many projects that would be extremely valuable from a future productivity perspective may not

qualify as “shovel ready” and thus have relatively little to offer in terms of near-term job growth. The long lags associated with environmental reviews, permitting, site acquisition and so forth have traditionally hampered the use of public works projects as an anti-recession policy.

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**Ideally, there is an approach to transportation investment that can advance both goals: long-term productivity gains and shorter-term job creation.**

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Another factor to be considered in terms of the relative effectiveness of transportation spending as a stimulus measure is that subsidies to operations and maintenance could in many cases do more to create jobs in the short-term than expenditures for capital investment.<sup>12</sup> Statutory and programmatic requirements typically limit the use of federal funds to cover operations and maintenance out of concern that subsidizing these costs will promote inefficiency (for example, by allowing operators to rely on subsidies instead of cutting costs and/or increasing revenues from tolls or fares).<sup>13</sup> These prohibitions may be justified in general and especially in periods of relative prosperity on the part of local and state governments. But, in deep recessions, many states

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<sup>12</sup> There are several reasons why this is the case. For one, operations and maintenance are typically more labor intensive than capital expenditures. A large fraction of the cost of many capital investments, like building new highway bridges and subway systems, is for purchasing materials such as cement and steel. This means a smaller fraction of the investment goes to employing workers and thus fewer jobs are produced per dollar of spending. Furthermore, it is often the case that much of the material used in transportation infrastructure projects is imported from overseas. This further reduces the direct benefit of capital expenditures to the American economy.

<sup>13</sup> There are also concerns among some transit agencies that operating subsidies could force them to reopen labor negotiations.

are cutting maintenance and reducing transit service in order to cope with funding shortfalls. If, based on appropriate and effective measures to evaluate rates of return, expenditures on operations or maintenance can be shown to produce greater returns in terms of job creation and long-term economic productivity perhaps they should be reconsidered at least temporarily during economic downturns.<sup>14</sup> This suggests that federal funding mechanisms should not be biased for or against expenditures on operations or maintenance versus capital improvements. If the goal is to use public funds in the most efficient and productive fashion, it is important that there be flexibility to pursue the highest returns on spending.<sup>15</sup>

In the last two years efforts to forestall a deeper slide into economic depression and to address the unemployment situation led to an increase in federal spending on transportation. In 2009 alone, federal funding available for transportation included both \$35 billion in General Fund transfers as well as \$48.1 billion in stimulus spending through the American Recovery and Reinvestment Act.<sup>16</sup>

Given the pressure to put these funds to work quickly, some of the transportation spending that occurred in 2009 and 2010 undoubtedly included projects that may produce some short-run employment gains but will have less to contribute to longer-term economic growth. Similarly, other projects have almost certainly been funded that are very worthy in terms of their long-run impact on productivity but that have been too slow getting started to alleviate short-term unemployment. It is certainly also possible that some expenditures have had little merit on either score—in terms of a short-term jobs stimulus or in terms of future productivity. Clearly, the best public investments address both goals.

14 The use of stimulus funds to forestall cutbacks in operations—which are common during an economic downturn—is likely to create faster economic responses than would capital investments. And since a higher proportion of operations and maintenance expenditures are likely to be for labor while a higher proportion of capital expenditures are for materials and services, it follows that a larger proportion of those wages will be spent relatively quickly in the communities where they are earned, thus stimulating other local businesses and circulating or “turning over” the funds more frequently.

15 Of course, the risk remains that the use of federal funds for operations and maintenance will create waste and “featherbedding.” We observed earlier that capital projects are not all of equal merit and the same is of course true of expenditures on operations and maintenance. Either way proper incentives are required.

16 The American Recovery and Reinvestment Act of 2009 Transportation and Infrastructure Provisions Implementation Status as of November 12, 2010. Committee on Transportation and Infrastructure, Prepared for The Honorable James L. Oberstar, Chairman by the Committee on Transportation and Infrastructure Majority Staff. 2 December 2010. <http://transportation.house.gov/Media/file/ARRA/20101202/Recovery%20Act%2012-2-10%20Report.pdf>





There is no single method for assessing the economic impacts of transportation investments.



# The “Multiplier” as a Method for Estimating Job Impacts

As noted previously, a “jobs multiplier” is often used to estimate the number of jobs created in direct response to spending on transportation projects.<sup>17</sup> For example, a commonly reported multiplier figure is one used by the U.S. Department of Transportation (DOT), which in 2007 estimated that each \$1 billion spent on the federal highway system supported, on average, 30,000 jobs.<sup>18</sup> Since spending on transportation is so often justified on the basis of its jobs impacts, it is important to understand the assumptions and methodology behind this and other estimates frequently cited in support of infrastructure spending.

The concept of the multiplier stems from the fact that when money is spent, it is re-circulated in the economy. When public funds are used to pay a construction worker, for example, the worker re-spends those dollars to buy food, clothing, medical care, and entertainment—thus boosting incomes and activity in those industries. In this way, the initial expenditure prompts successive rounds of economic activity in other sectors of the economy. An economic multiplier is a quantitative measure of the extent to which the cumulative impact of federal spending is expected to be larger than the initial outlay measured in isolation.<sup>19</sup>

There is no single accepted method for assessing the economic impacts of transportation investments.

Analysts have deployed many models and complicated methods—and produced a wide variety of results. What these results have in common is that they depend heavily on the conditions being considered, on the assumptions being made, and (frequently) on the conclusions being sought.<sup>20</sup> Similar methodological difficulties arose when BPC sought to develop appropriate economic metrics for evaluating federal transportation programs in the context of its 2009 report.<sup>21</sup> BPC’s concern then was that employment estimates alone provide an inadequate measure of the economic impact of transportation investments: in the long run, for example, lowering the costs of business transactions might be a far more important consequence to consider. But job creation is certainly an important economic indicator in assessing the impact of infrastructure spending—one that is politically salient at any time, but that is likely to be given particular weight in the midst of a long recession and high unemployment.

Multiplier estimates are generally designed to capture three avenues for job creation:

- **Direct effects**—jobs involved in the production or construction of new infrastructure (e.g. road construction jobs)
- **Indirect effects**—jobs financed when supplies, materials, and services are purchased as a result of infrastructure construction (e.g. steel production and fabrication); in other words, indirect effects capture impacts on the chain of suppliers

17 Jobs are not technically “created” by spending. If the economy is at full employment, transportation jobs come at the expense of another sector. If the economy is operating below full employment, spending only speeds the recovery to full employment. In either case, spending does not “create” jobs, but rather reallocates them from the future to the present or from one sector to another. For the purposes of this paper, however, we refer to job creation in the sense that is usually meant when discussing transportation legislation.

18 U.S. Department of Transportation, Federal Highway Administration, *Employment Impacts of Highway Infrastructure Investment*, p. 1, <http://www.fhwa.dot.gov/policy/otps/publications.htm>.

19 Dumas, Lloyd J. “Economic Multipliers and the Economic Impact of DOE Spending in New Mexico.” *Nuclear Watch of New Mexico*. Mar 2003. p. 1-13.

20 Weisbrod, Glen and Burton Weisbrod. “Assessing the Economic Impact of Transportation Projects: How to Choose the Appropriate Technique for Your Project.” *Transportation Research Circular Number 477*. Oct 1997.

21 National Transportation Policy Project (2009). *Performance Driven: A New Vision for U.S. Transportation Policy*. Bipartisan Policy Center, Washington, D.C.

- **Induced effects**—jobs that arise when the overall level of spending in the economy increases in response to higher incomes and expenditures among workers and businesses (including, for example, in the retail sector)<sup>22</sup> as employees in the construction sector spend their earnings<sup>23</sup>

Estimated multiplier effects carry substantial uncertainty.<sup>24</sup> Generally, they are not purely data-driven, rather they rely on judgments and assumptions, may not take into account aspects of the structure or timing of an investment that would have an impact on its actual multiplier effects, and may miss qualities of the specific economic environment in which an investment is being made.<sup>25</sup> Multiplier estimates developed using a fine scale that can account for local economic conditions and nuances are therefore more accurate.<sup>26</sup> At the same time, applying a fine geographic scale may cause a model to miss offsetting impacts outside the city, county, or state being analyzed.

On the whole, employment multipliers are commonly misused and often misunderstood.<sup>27</sup> At best they represent a highly uncertain estimate of the total short-term

jobs impact of a given investment. The temptation, frequently, is to overstate positive impacts by incorporating only optimistic assumptions throughout the modeling process.<sup>28</sup> Only rarely are multiplier effects quoted in combination with an estimated margin of error, which is the minimum information required to make a judgment about their reliability. This means that applying a multiplier often introduces an inherent bias. Since there is always demand for information about the likely impacts of a given public expenditure, advocates for particular programs or projects tend to employ optimistic employment forecasts. Their subsequent assessments of outcomes likewise tend to be optimistic, and often produce estimates that diverge substantially from those developed by critics of the program or project in question. To provide a more accurate picture and clarify sources of uncertainty for policymakers and the public, it is important that unbiased evaluators cite results in terms of ranges rather than precise figures, particularly when it comes to estimated “jobs benefits.” In April of 2010, for example, the US Council of Economic Advisors (CEA) estimated that the American Recovery and Reinvestment Act of 2009—which by that time had been in effect for three quarters of a fiscal year—had increased overall employment (as of the end of March 2010) by between 2.2 and 2.8 million jobs above what it would have been without the law. By contrast, the CBO released a more conservative estimate of the bill’s impact at between 1.2 and 2.8 million jobs for the same time period. The range is considerable, but a more precise figure would be misleading given the large uncertainties involved.<sup>29</sup>

Despite the fact that it is virtually impossible to construct accurate national models of the economy that can correctly identify impacts—especially at differ-

22 Wikrent, Tony. “An Infrastructure Program for Millions of New Jobs.” 1 Dec 2009. <http://economicpopulist.org/content/19-million-new-jobs>

23 Heintz, James and Robert Pollin and Heidi Garrett-Peltier. “How Infrastructure Investments Support the U.S. Economy: Employment, Productivity and Growth.” Political Economy Research Institute (PERI) and Alliance for American Manufacturing (AAM). January 2009.

24 “The Case for Fiscal Stimulus: Likely Effects of American Recovery and Reinvestment Act.” States News Service. 27 Feb 2009.

25 Armstrong, Harvey and Jim Taylor. “Regional Economics and Policy 3rd ed.” p. 6-32, 45-47, 50, 52, 55, 149, 251, 260, 342.

26 Dumas, Lloyd J. “Economic Multipliers and the Economic Impact of DOE Spending in New Mexico.” Nuclear Watch of New Mexico. Mar 2003. p. 1-13.

27 Deller, Steve. “Employment Multiplier Effect is Often Misunderstood.” Wisconsin State Journal, Business; Economic Snapshot; Pg. C1. Madison Newspapers, Inc: Madison. 5 Apr 2009.

28 Dumas, Lloyd J. “Economic Multipliers and the Economic Impact of DOE Spending in New Mexico.” Nuclear Watch of New Mexico. Mar 2003. p. 1-13.

29 Linda Levine, op. cit., pp. 11-12.

ent geographic scales—these kinds of jobs estimates continue to be routinely quoted by advocates for particular projects and programs. To the extent that it is possible to accurately estimate job creation using economic multipliers at all, it can really only be done at the local or regional level. In theory, local and regional numbers could be added together to generate national numbers, but in practice there is no clear way to ensure that this approach accurately combines multiple local and regional effects and their interactions. Widely publicized jobs estimates also routinely fail to reference the time period over which employment impacts are likely to occur, leaving many with the impression that jobs will materialize sooner than is often the case.

Finally, the most comprehensive research on economic returns from infrastructure investments underscores the importance of broad productivity returns, rather than the direct employment associated with construction. In one notable empirical analysis of the relationship between highway investment and economic growth, Professor Ishaq Nadiri of New York University studied the effects of changes in highway assets from the 1950s through the mid 1990s. He concluded that highway investments in the 1950s and 1960s provided average annual rates of return on the order of 50–60 percent, with more than half of the benefits from these investments accruing to the services and nonmanufacturing sectors. This contrasts with the more traditional view that freight, logistics, and vehicle manufacturing benefit the most from highway improvements<sup>30</sup>—let alone the even narrower view that most of the economic benefits are captured by the construction sector. Complementary research published in 2001 by Remy

Prud'homme and Chang-Woon Lee<sup>31</sup> compared the productivity of European cities with different transportation systems. According to these researchers, “The efficiency of a city is a function of the effective size of its labor market.” More specifically, Prud'homme and Lee conclude that a 10 percent improvement in access to labor increases productivity, and therefore output, by 2.4 percent. A central observation is that the United States and other advanced economies are rooted in mobile societies that depend on ready and reliable access to labor, raw materials, affordable and reliable sources of energy, and the products of other firms.

In sum, estimates or assumptions about how many jobs will be created by a given increment of transportation spending too often serve to mask and distort the many factors that must be understood to make a meaningful comparative assessment of different investment opportunities. Not all transportation projects are equally deserving of scarce taxpayer dollars. Multiplier estimates too often convey a sense of certainty about the likely outcomes to be expected from funding different projects, when in fact those multipliers are usually based on highly uncertain and often incomplete assumptions.<sup>32</sup> Broader, more sophisticated and more comprehensive measures and assessment methodologies are essential to ensure that scarce public resources are allocated in ways that maximize long-run economic returns, both in terms of productivity and employment.

30 Nadiri, Ishaq and Theofanis Mamuneas. “Contribution of Highway Capital to Output and Productivity Growth in the US Economy and Industries.” Federal Highway Administration. Aug. 1998.

31 Prud'homme, Remy and Lee, Chang-Woon, “Size, Sprawl, Speed and the Efficiency of Cities.”

32 “The Case For Fiscal Stimulus: Likely Effects of American Recovery and Reinvestment Act.” States News Service. 27 Feb 2009.



The nation can no longer afford to support poorly targeted investments when the needs are so great and public resources are so constrained.



# Conclusion and Recommendations

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The United States must advance an approach to federal transportation policy that both promotes long-term economic growth and supports high-quality jobs. Wise and well-targeted expenditures on transportation infrastructure can generate lasting productivity gains, while also providing a more immediate stimulus to accelerate the nation's ongoing recovery from a devastating recession. In the current environment of growing deficits and urgent pressure to cut spending, the ability to demonstrate that scarce taxpayer dollars are being used efficiently is essential. This means that more comprehensive and sophisticated analytical tools are needed to assess the short- and long-run benefits of different transportation programs and projects. Simply put, the nation can no longer afford to support poorly targeted investments when the needs are so great and public resources are so constrained. Further, a more rigorous method for setting transportation priorities will support an investment strategy that maximizes the transportation sector's contribution to sustained economic growth and recovery.

These new pressures and challenges come at a time when many experts and stakeholders, including the BPC, are calling for a fundamental overhaul of federal transportation policy and funding mechanisms. They argue that future transportation spending must be driven by considerations of economic merit and guided by a clear articulation of the federal role. Short-term job creation is certainly an important and legitimate goal of public policy, especially at a time of high unemployment, but as this paper demonstrates, an overly narrow focus on immediate job impacts is likely to be short-sighted and produce sub-optimal results, especially if it detracts from efforts to implement more fundamental programmatic reforms. Of course, public resources should be spent wisely at any time. At the same time they can also create employment opportunities in the short-term and contribute to the nation's economic re-

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**Well-targeted transportation investments can deliver long-term benefits in terms of improved efficiency and productivity by reducing costs associated with congestion, environmental damage, and accidents.**

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covery. To achieve these outcomes, however, our nation must approach transportation spending differently than in the past. At least three specific changes are needed:

**1) Borrowed funds should not be put into existing channels for transportation spending in an effort to increase short-term employment.**

Many current highway programs, such as the "Equity Bonus" program, distribute billions of dollars in funding to states with little accountability, from an economic perspective, for how that money is used. Yet many advocate continued funding for such programs because they "create jobs." In the haste to pump more money into these programs, it becomes distinctly possible—indeed, even likely—that scarce and now usually borrowed resources are being directed to projects that do not meet reasonable and appropriate productivity criteria for public expenditures. For reasons discussed in this paper, even the jobs benefits commonly ascribed to these expenditures are more uncertain than might first appear. Given that the "multiplier effect" typically used to calculate employment impacts is often exaggerated and rarely qualified, such jobs claims should not form the basis for spending decisions, particularly in a time of constrained resources and overwhelming national deficits.

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Instead of focusing on how the money is spent—that is, on whether funds go to operations versus capital or to highways versus transit—the focus must shift to the outcomes being achieved with a particular expenditure.

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**2) Funding for transportation infrastructure that is intended to create jobs should focus on investments that are both “shovel-ready” AND provide long-term benefits.** Broad support for efforts to speed the pace of economic recovery may suggest that priority should be given to projects that can be implemented quickly. However, if projects are not justified from a longer-run perspective it is not worth burdening the economy with substandard investments paid for with increased public debt. Beyond helping to create some new construction jobs, transportation expenditures must have clear merit from the standpoint of advancing long-term federal interests. To ensure that this is the case, BPC has elsewhere advocated for defining the federal role more clearly, streamlining multiple

programs into a few funding streams, embedding performance metrics in funding mechanisms, and introducing accountability for results. The focus of reform needs to be on developing a federal program that advances the full range of national interests in transportation, including economic growth, energy security, environmental protection, and safety. Spurring economic activity and creating jobs is by no means independent of, or at odds with, meeting these other objectives but it should not overwhelm all other considerations in the naïve belief that short-term spending by itself can relieve the burdens associated with a deep recession.

**3) Federal transportation policy should be flexible on the “how” while being specific about outcomes.** A thoughtful, strategic approach to transportation investment should not be constrained by the silos and restrictions that dominate the federal government’s existing surface transportation program. Instead of focusing on how the money is spent—that is, on whether funds go to operations versus capital or to highways versus transit—the focus must shift to the *outcomes* being achieved with a particular expenditure. If the most pressing outcomes at this point in time relate to job creation and long-term economic recovery, both of those outcomes should drive decisions about how to allocate federal resources and measure progress.





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# Reports from the Bipartisan Policy Center



## Performance Driven: A New Vision for U.S. Transportation Policy

June 9, 2009

National transportation policy has lost direction and a clear sense of purpose, threatening substantial costs to our collective prosperity, security, environment, and quality of life. In its founda-

tional report the National Transportation Policy Project (NTPP) recommends bold and comprehensive reform founded on a relatively simple proposition: U.S. transportation policy needs to be more performance-driven, more directly linked to a set of clearly articulated goals, and more accountable for results.



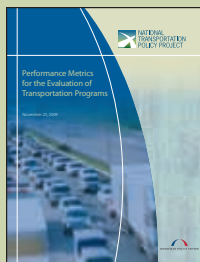
## The Critical Role of Information Technology in Improving Surface Transportation Performance

August 27, 2009

By Thomas A. Horan, Ph.D.

This research outlines the potential of Information Technology (IT) and

Intelligent Transportation Systems (ITS) to enhance monitoring and performance of surface transportation systems. The paper reviews trends and accomplishments of the federal ITS programs and then considers the need to accelerate related innovations in the context of a performance-based system.

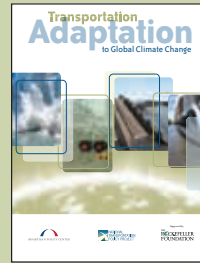


## Performance Metrics for the Evaluation of Transportation Programs

November 23, 2009

By Richard Mudge and Keith Jasper, Delcan Corporation

America's economic strength is due in large part to a surface transportation system that has historically ranked among the best in the world. Maintaining and enhancing that system to meet the transportation needs of the 21st century is therefore a critical national priority. This report put forth recommendations for measuring the performance of state and metropolitan transportation programs funded with federal dollars.



## Transportation Adaptation to Global Climate Change

December 15, 2009

Prepared by Cambridge Systematics, Inc.

Climate change will impact many sectors of the economy, and while required adaptations for some sectors already have

been studied in depth, the same cannot be said of transportation infrastructure. The paper outlines key areas for federal policy action. It proposes three main vehicles for implementing adaptation policy: the anticipated surface transportation authorization, climate and energy legislation, and executive actions.

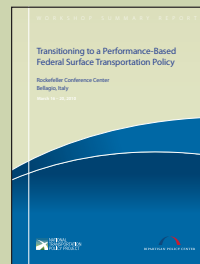


## New Starts: Lessons Learned for Discretionary Federal Transportation Funding Programs

January 25, 2010

By Donald J. Emerson and Jeffrey D. Ensor, Parsons Brinckerhoff

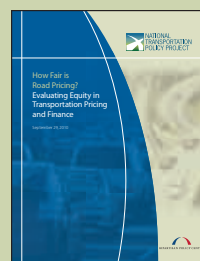
The New Starts program is essentially the only discretionary transportation program that requires investment objectives be worked into program design and implementation. This paper analyzes the New Starts program to identify lessons learned and program components that might be useful in the design of future competitive programs.



## Transitioning to a Performance-Based Federal Surface Transportation Policy

June 23, 2010

The National Transportation Policy Project (NTPP) held an international workshop Transitioning to a Performance-Based Federal Surface Transportation Policy. This workshop summary report describes the findings of the conference proceedings.



## How Fair is Road Pricing? Evaluating Equity in Transportation Pricing and Finance

Sept. 29, 2010

By Brian D. Taylor, Ph.D.

This research paper examines the equity implications of road pricing. It systematically considers the various ways that road pricing raises equity issues. Examining how equity issues have been addressed in current applications of road pricing, this paper makes recommendations for more equitable solutions.



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