

Infrastructure 2011

A STRATEGIC PRIORITY

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Cover: Opened in February 2010, the bus rapid transit corridor in Guangzhou, China, is one of Asia's busiest transit systems, carrying 800,000 passengers daily. (Karl Fjellstrom/ITDP)



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Infrastructure 2011: A Strategic Priority is the fifth in a series of annual reports coproduced by the Urban Land Institute and Ernst & Young. Each year, we assess infrastructure policy and initiatives in the United States and around the world, examine future trends, and recommend approaches for infrastructure investment strategies to help enable long-term regional growth and prosperity. The report is based on interviews with infrastructure experts, plus information gathered at infrastructure forums and up-to-date research.

This year, we explore how many nations, regions, and cities are struggling to develop and advance necessary infrastructure policies while buffeted by challenging fiscal realities and budget deficits, as well as the effects on infrastructure of the devastating floods in Australia, tensions in the Middle East, and the earthquake and tsunami in Japan. As many governments retrench and reorder priorities, ramped-up private sector participation and merit-based investment discipline likely will become more essential in funding new transformational systems as well as even more urgent repairs and maintenance. Not surprisingly, governments appear to have a better chance at success when they identify deficiencies and needs, develop long-range national and regional plans to address them, and harness an array of public and private resources to fund projects.

In this report, we highlight infrastructure activity across six continents, with a special focus on major U.S. metropolitan markets. In 2011, most American cities face hard choices in deciding which initiatives can proceed and how to achieve the best value from constrained budgets. Again, some places do better than others, especially those where regional political consensus has been achieved to support infrastructure programs and attract private capital.

Over the years, ULI/E&Y reports have flagged the problems posed by outmoded U.S. infrastructure and proposed a host of multifaceted solutions based on global experience and local success. We have assessed the results of China's benchmark-setting spending—about 9 percent of GDP devoted to infrastructure, compared with less than 3 percent in the United States—and western Europe's connectivity programs to link passenger rail, freight, and road systems while

lowering carbon emissions. Our reports have also noted how Canada and Australia have leapfrogged the United States in confronting aging and crumbling networks, as well as employing public/private partnerships.

In 2011, U.S. policy makers, led by President Obama, certainly appear more aware of the infrastructure issues documented in previous reports. But doubts abound over whether they can take meaningful near-term action while stanching government budget shortfalls and reducing debt. Despite new hurdles and lost time, the opportunity still exists to make some progress. But government leaders, the business community, and the public at large must gain consensus for concentrating resources on projects that make the most sense for ensuring the nation's future economic success and global competitiveness.



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Executive Summary

Based on extensive research and interviews with industry leaders, this report surveys global infrastructure trends and activities in 2011 (part I), then examines in depth current U.S. infrastructure policy and the outlook for meeting the nation's significant repair and rebuilding challenges (part II). The U.S. section forecasts possible progress over the next several years, tracks disparate strategies and major projects in the country's primary metropolitan areas, and recommends approaches for overcoming substantial political and fiscal obstacles.

Overview

Hoping to gain footholds in a rapidly evolving global marketplace, most leading countries have reaffirmed infrastructure repair and development as high investment and strategic priorities in 2011, but struggle to address funding shortfalls. Whether in countries with mature economies coping in order to emerge from recent economic doldrums or their more vigorous emerging-market competitors seeking further advances, governments and business leaders realize that executing on well-established, national infrastructure programs and policies is integral to future success and prosperity.

In general, governments confront divergent choices in their effort to fund essential maintenance or build expensive new systems while at the same time controlling overall expenditures in constrained budget environments. Some projects get mothballed at the expense of others, while public agencies increasingly look to private sources for funding and financing. Countries appear to gain an edge when they can execute more

The Seattle Center Monorail connects downtown Seattle with Lower Queen Anne, the city's entertainment center.

forward-looking plans that tie infrastructure needs directly to securing future economic advantages, giving them the ability to direct funding more strategically and efficiently.

The United States notably continues to lag its global competition—laboring without a national infrastructure plan, lacking political consensus, and contending with severe federal, state, and local budget deficits that limit options. Some metropolitan areas appear better positioned when they can forge plans and pool resources for new transit lines and road systems across multiple jurisdictions. States with effective procurement programs and policies are beginning to profit from their ability to engage in public/private partnerships (PPPs). Governors and legislators across the country are beginning to take notice of successful approaches and look to adopt some of the more promising development and finance strategies.

Global Progress

In most of the developed world and in many emerging markets, countries have committed to fulfilling infrastructure agendas as essential for sustaining or enhancing living standards in an increasingly competitive global marketplace. A lot can be learned from what's occurring across the globe, as many countries confront their infrastructure challenges head on:

- Despite a severe austerity budget, the U.K. has committed US\$326 billion (£200 billion) over the next five years to continue national infrastructure projects focused on rail, energy production, and broadband access, with an emphasis on reducing the nation's carbon emissions through investments in renewable energy.
- European Union countries generally view infrastructure expenditures as dual wins for helping stimulate slowly resuscitating economies and modernizing systems to ensure long-term commercial growth. France, Germany, Spain, and Italy continue to build out high-speed rail and freight networks between major cities and extend cross-border transport links while attempting to lower carbon footprints in line with E.U. objectives. However, many E.U. countries still need more innovation and government support to make PPPs truly viable.
- Australia is working to shore up existing infrastructure while setting national priorities for future investments; expansion of ports, refashioning of rail lines, and relief of urban traffic congestion take precedence.
- Canada is expanding its PPP initiatives to address the revamping of aging facilities.
- Flush with cash from its role as an export-driven manufacturing powerhouse, China is moving ahead with wide-ranging infrastructure programs, including completion of an unprecedented 10,000-mile high-speed rail network by 2020. Newly constructed airports, ports, and subway systems in China's major centers facilitate the country's growth into the world's second-largest economy and help it deal with mounting congestion from burgeoning urban populations.
- India is working hard to attract more private financing for desperately needed infrastructure to nurture aspirations for global economic leadership, while the United Arab Emirates and Kuwait continue to use oil wealth to build out transport hubs and seek energy-efficient solutions for future power and water needs.
- Brazil is accelerating road, transit, and water projects to accommodate its burgeoning economy and buttress an enhanced standing on the world stage; it does not want to disappoint people visiting for the 2014 World Cup and the 2016 Summer Olympics.

Turmoil and revolution in the Middle East and North Africa have at least temporarily spiked ever-fluctuating energy prices to discomfiting levels and are reinforcing strategies for reducing reliance on oil imports in some regions. Certain countries, especially in the European Union, are getting a head start by already setting decreased carbon emission targets through alternative energy sources like wind

power and nuclear energy, as well as by expanding mass transit and rail systems to provide alternatives to car travel. These policies also can help reduce road congestion, which not only saps economic productivity, but also increases pollution in many urban centers.

America Struggles

In contrast with its global competition, the United States is lurching along a problematic course—potentially losing additional ground. After more than 30 years of conspicuously underfunding infrastructure and faced with large budget deficits, increasing numbers of national and local leaders have come to recognize and discuss how to deal with evident problems. But a politically fractured government has mustered little appetite to confront the daunting challenges, which include finding an estimated \$2 trillion just to rebuild deteriorating networks. Operating beyond their planned life cycles, these systems include roads, bridges, water lines, sewage treatment plants, and dams serving the nation’s primary economic centers.

Although President Obama ranks infrastructure as one of his administration’s top three “win the future” initiatives (together with education and innovation), the chances for setting and executing national priorities appear to be foundering in partisan debate over tax burdens and how to cut exploding government debt. Plans for transformational networks—regional high-speed passenger rail, a new electric grid tied to energy-saving technologies, and state-of-the-art satellite air traffic control systems to replace obsolete radar stations—will probably get delayed, pared back, or shelved.

Despite the nation’s unemployment woes, the vast job-creation potential of infrastructure projects is being sidetracked by concerns about government spending appetites and potential cost overruns. Related benefits from reducing carbon footprints—energy efficiencies and greater independence from problematic foreign energy sources—are also failing to gain much traction. The overriding stumbling block to generating support for rebuilding the country’s infrastructure remains simple public resistance to paying more for these systems—either through higher taxes or user fees. Although informed voters have passed bond issues and even some sales tax increases for new projects, Congress perennially refuses to raise the federal gasoline tax or allow states to put new tolls on interstate highways, which could help ramp up funding for mass transit alternatives and repair existing highways and bridges.



Congress has also failed to act on authorization of the next federal surface transportation bill. SAFETEA-LU, the 2005 transportation authorization legislation, should have expired nearly two years ago but has been limping along with numerous extensions. Consensus about what should replace SAFETEA-LU, the appropriate federal role in transportation infrastructure, and what reforms are the most pressing and necessary seems to be eluding policy makers.

What does seem clear is that the appetite for austerity will mean a pared-down federal transportation budget, a renewed commitment to matching revenues to expenditures, and an end to general-revenue bailouts of the Highway Trust Fund. In the absence of a willingness to increase the gasoline tax or raise revenues in other ways, what this will mean on the ground is less federal funding for everything from roads to rail.

Metropolitan Story

States and cities, which suffer from decreasing revenues—from sales, property, and gasoline taxes—also face the phase-out of federal stimulus money and the prospect of further declines in federal funding. Most local officials find it more politically palatable to reduce infrastructure budgets than to call for tax hikes, and governments scramble for available dollars. As a result:

- Many older cities put the brakes on new projects, but still cannot find enough money to fund many repairs on aging systems.
- Metropolitan areas like Denver, Minneapolis, Seattle, and Salt Lake City have better success in realizing new transport initiatives with local agencies working together to meet priorities.
- Multistate regions with byzantine agency structures tend to grapple over conflicting agendas and lack consensus for how to allocate precious dollars.
- Cities in states that do not provide gasoline tax revenues or general fund support for mass transit may have no choice but to push light-rail plans into limbo.
- More states will latch on to PPP models to finance new projects; Virginia and Florida's recent experience with toll roads and high-occupancy-toll (HOT) lanes provide models.

A Path Forward

Real progress may still be possible if waste hawks concentrate more of the limited funding available on merit-based projects with significant national and regional economic benefits and government agencies are motivated to fashion workable partnerships with private operators through improved procurement protocols. The interest in gaining access to private capital and expertise through PPPs should accelerate as public funding sources diminish. Officials realize these transactions can help reduce expenditures in building and/or managing certain types of projects and concessions. Some states and local governments wisely are beginning to undertake realistic life-cycle budgeting for operating and maintaining systems, which can result in lower costs and greater efficiencies over time.

This report also recommends:

- focusing attention first on making necessary repairs and upgrades to existing systems;
- developing a national infrastructure plan, then using a "Race to the Top" model for funding merit-based projects at the state and local level that dovetail with the country's overall economic priorities;
- concentrating spending on the nation's primary metropolitan areas, and in particular the global gateway markets where population and business activity are concentrated, and at the same time integrating infrastructure and land use planning to gain greater efficiencies;

The Gerald Desmond Bridge illuminates a lumber transport facility at the Port of Long Beach in California.
(Tom Paiva/Taxi/Getty Images)

- providing greater long-term certainty for federal funding to support planning for capital projects;
- instituting federal and state infrastructure banks to help support project financing, including public/private partnerships; and
- phasing in user fees to help fund infrastructure initiatives on a continuing basis.

For 2011, the United States has plenty of worldwide company in coming to grips with infrastructure ambitions and soberly assessing what can be done under challenging circumstances. That often means downscaling ambitions, doing more with less, finding creative solutions, and investing strategically.





A construction worker collects cement for a highway project in Mexico City. (Bloomberg/Getty Images)



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Construction workers carry materials to the site of a new bridge over the Hugli River in India. (Andrea Pistolesi/Getty Images)



WORLD VIEW





1 Global Overview

Many governments across the world rank infrastructure policy among their greatest concerns. They formulate national plans, execute on long-term strategies, protect budgets from cutbacks in difficult fiscal times, and in some cases accelerate spending. These nations see modernization of infrastructure as critical to future economic competitiveness and/or crucial to accommodating expanding populations in urbanizing environments. They also lead in “broadening the finance spectrum,” trying “to access more private capital more effectively” to make up for gaps in government funding, says one interviewee. And especially in western Europe, countries increasingly integrate land use policy and infrastructure strategies to gain energy efficiencies and tamp down greenhouse gas emissions.

Implementing “big plans will become more predicated” on “sorting out sources of funding” and engaging private capital sources to make up for expected declines in government shares. Governments need to find ways to put less risk on private funders, especially for new projects, interviewees say. “That’s the only way to attract big dollars from pension funds, insurance companies, and investment banks.” In return, investors should be satisfied with long-term, steady, reliable performance on assets. “They can’t get greedy looking for super returns.” Now, a shift is underway because of government austerity and fiscal needs to employ different financing strategies. “It will be a big challenge to figure these out.”

Indeed, global estimates for infrastructure spending requirements over the next quarter century total more than \$50 trillion.

In an effort to reduce energy use, the old lights on the Sky Tower in Auckland, New Zealand, were replaced with light-emitting diode (LED) lights in 2009.

CHINA | Spending Leader Faces Challenges

Largely unaffected by recent global economic travail, China's historic and unprecedented infrastructure building spree is stampeding ahead. The Asian powerhouse is moving closer to completing the world's largest high-speed train network, a 10,000-mile honeycomb linking major cities across an expanse similar in size to the United States. But that is only a small part of a trillion-dollar splurge that is also constructing a nationwide tolled highway system, comparable to U.S. interstates; 1,900 miles of new urban

National Infrastructure Programs

Country	Program	Description
Australia	Infrastructure Australia	This program was established in 2008 to take a national approach to infrastructure planning, funding, and implementation. The 11-member Infrastructure Australia council has developed a blueprint for national infrastructure priorities, provides a list of recommended projects that should be funded, and advises the government on the allocation of a A\$20 billion (US\$20.2 billion) Building Australia Fund.
Brazil	Growth Acceleration Program	This strategic investment program oversees and approves initiatives and public works investment. PAC, the first phase of the program launched in 2007, invested \$349 billion in areas, including energy, urban infrastructure, sanitation, and transportation. PAC-2 is a \$900 billion extension of the PAC program for 2011–2014.
Canada	Infrastructure Canada	In 2002, the Infrastructure Canada unit was established within the Department for Transport, Infrastructure, and Communities to lead government efforts on infrastructure. The unit is responsible for Building Canada, the government's C\$33 billion (US\$33.5 billion), seven-year infrastructure plan, along with about C\$5 billion (US\$5.1 billion) in funding for a variety of targeted infrastructure programs.
China	12th Five-Year Plan	The 12th Five-Year Plan, which began in 2011, is allocating some \$1 trillion in infrastructure spending over five years. The program is developed by the Central Committee with help from the Ministry of Housing and Urban-Rural Development. Much of the investment will go toward building high-speed rail, with a secondary emphasis on water supply, electricity, and highways.
India	11th and 12th Five-Year Plans	The 11th Five-Year Plan, which began in 2007, is developed and implemented by India's Planning Commission. Of the plan's estimated \$500 billion in total infrastructure investment, one-third will flow to roads, including a project to upgrade, rehabilitate, and widen major highways in India. The rest will be spent on transit, water, electricity, and other infrastructure sectors. The country's 12th Five-Year Plan, which runs from 2012 to 2017, will double the amount spent on infrastructure to \$1 trillion.
Mexico	National Infrastructure Plan	Mexico's National Infrastructure Plan was launched in 2007 and will run for five years with the goal of increasing the coverage, quality, and competitiveness of Mexico's infrastructure. The program has identified more than 300 infrastructure projects in multiple sectors, totaling over \$141 billion, to be financed using public/private partnerships, with significant Mexican public sector investment. These projects include investment in ports, airports, roads, railways, water, and energy.
New Zealand	National Infrastructure Plan	This program was established in 2009 to review infrastructure priorities and provide cross-government coordination, planning, and expertise. The National Infrastructure Unit (a unit within Treasury), the National Infrastructure Advisory Board (composed of members outside the central government), and the minister for infrastructure are charged with developing a National Infrastructure Plan, highlighting New Zealand's infrastructure needs over the next 20 years. New Zealand's main focus is enhancing national connectivity via highways and decreasing traffic congestion.
U.K.	Infrastructure UK	The prime minister established Infrastructure UK in 2010 to advise the government on long-term infrastructure needs. The program is working to identify and address cross-cutting issues, with over \$320 billion of infrastructure investment planned over the next five years in sectors that include energy, transportation, and waste. The majority of funding will be drawn from the private sector.

Source: ULI research and analysis of various sources.

transit systems; streamlined harbor port terminals to handle the country's vast export traffic, and state-of-the-art airports. Beijing, Shanghai, and Guangzhou now have some of the most sophisticated and integrated transport systems in the world.

If all this domestic infrastructure activity is not enough, China also has ambitions to build high-speed rail lines across Asia and India, ultimately connecting to Europe's systems. In exchange for constructing the transcontinental lines, China would take natural resources needed to support its various burgeoning industries. The government has already made deals with Myanmar for lithium and with Russia on a trans-Siberian link. The country is also interested in exporting its infrastructure building prowess to Africa, South America, the Middle East, and even the United States.

But China's rapid transformation from a largely rural/agrarian country into an urban-oriented industrial giant is causing growing pains that even spending 9 percent of GDP annually on infrastructure cannot

Guangzhou Bus Rapid Transit

Guangzhou's bus rapid transit

(BRT) system opened in February 2010. With a length of 14 miles (22.5 km), 26 stations, and daily ridership of 800,000 passengers, the system has links to other modes of transportation, including underground connections to subway stations and continuous bike lanes along the route. Guangzhou's integrated BRT and bike-sharing system, which includes 5,500 bike parking spaces, won the Institute of Transportation and Development Policy's 2011 Sustainable Transport Award.

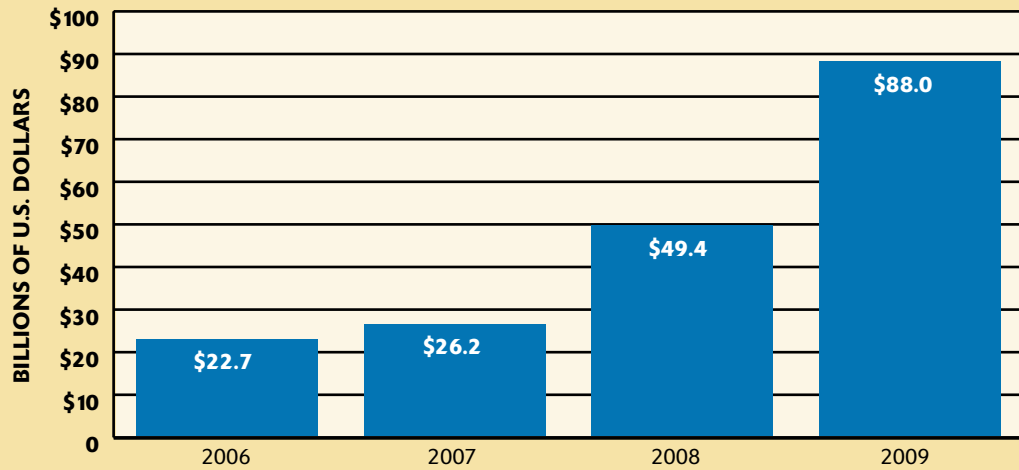
Operating for more than a year, Guangzhou's BRT is shattering ridership records and changing perceptions of bus transportation. This line carries more daily passengers than any of the city's five metro lines. The system's peak passenger flow is second in the world only to TransMilenio, the bus rapid transit system in Bogotá, Colombia. Guangzhou's BRT is an example of a strategic investment that provides customers with more transit options and greater mobility.



Guangzhou's bus rapid transit system helped unsnarl the city's traffic. These photos show the situation before (left) and after the opening of the new BRT corridor. (Karl Fjellstrom/ITDP)

China Is Laying Rails for High-Speed Passenger Lines and Freight

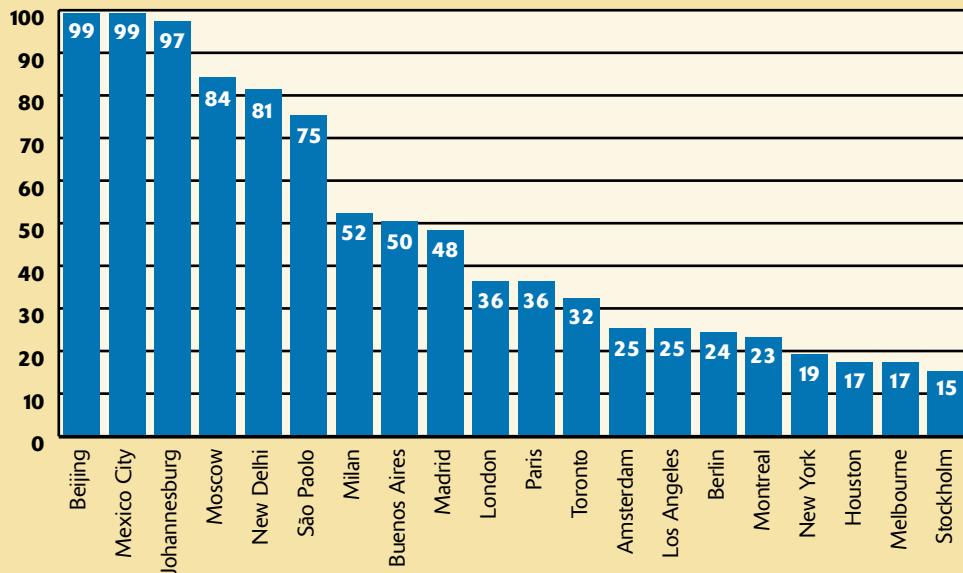
Chinese Railroad Construction



Source: *New York Times*, China Ministry of Railways.

Beijing and Mexico City Both Score a 99 on IBM's Index of "Commuter Pain"

IBM Commuter Pain Index



Source: IBM 2010 Commuter Pain Survey.

surmount. Major cities are struggling to handle traffic congestion as China's expanding middle class keeps buying cars in volumes the new road systems cannot handle. A 2010 IBM survey ranks Beijing's "commuter pain" as tied for the world's worst with Mexico City. Vehicle emissions also contribute to the familiar opaque, yellow-gray pollution haze that afflicts most urban areas. In addition, the recent ouster

of the lead official overseeing high-speed rail development raises questions about the construction quality of the expansive system.

As is the case in Mexico, no one trusts tap water anywhere in China—Beijing and Shanghai included. Water quality remains very third world, not 21st century.

INDIA | Trying to Catch Up without Falling Behind

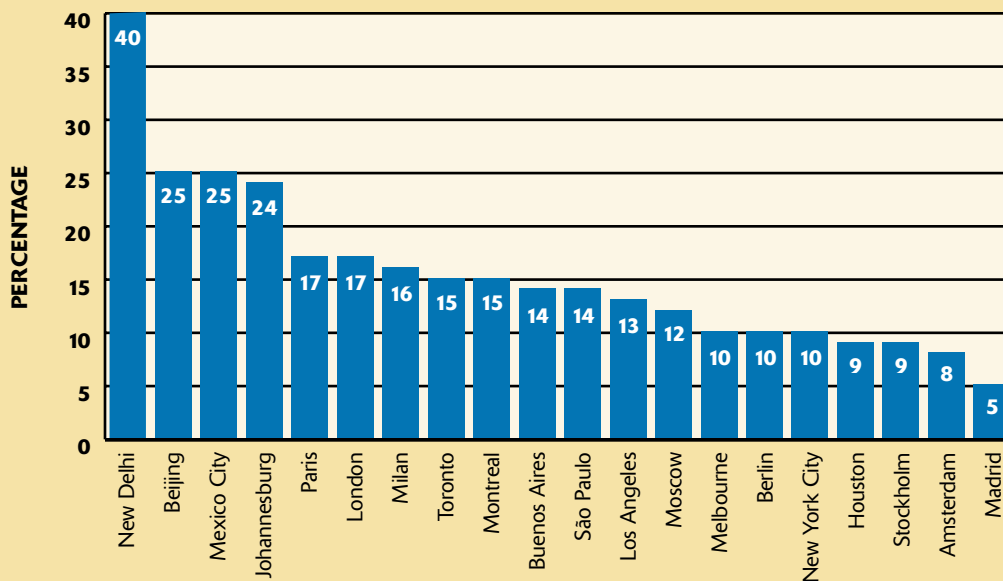
Such big needs, so much to do, and so many complications. Can India possibly build necessary infrastructure—for power, water, transportation—fast enough to sustain growth and meet its economic potential? Or will the nation hurtle into a rut, unable to support its vast population and business engine with basic services? Success will help transform India into one of the world’s 21st-century economic powerhouses. Failure condemns the country to further poverty.

Aside from its long-simmering dispute with northern neighbor Pakistan, India’s most pressing concern and number-one economic quandary boils down simply to overcoming wholly inadequate infrastructure:

- The World Economic Forum rates India’s infrastructure 89th of 133 survey countries.
- According to global management consulting firm McKinsey & Company, the country must build up an area equivalent in size to Chicago, accommodating nearly 3 million people, each year between now and 2030 to satisfy expected demand for urban housing and commercial space.
- 40 to 50 percent of fruits and vegetables rot on the way to market because of poor roads and ramshackle rail systems. India’s transport minister admits 16,000 of nation’s 70,000 kilometers of highways “aren’t worth driving on.”
- More than 600 million Indians live without electricity, 40 percent of the country’s water is wasted in inefficient farming, and 11 percent of urban residents and 65 percent of rural villagers have no access to toilets.

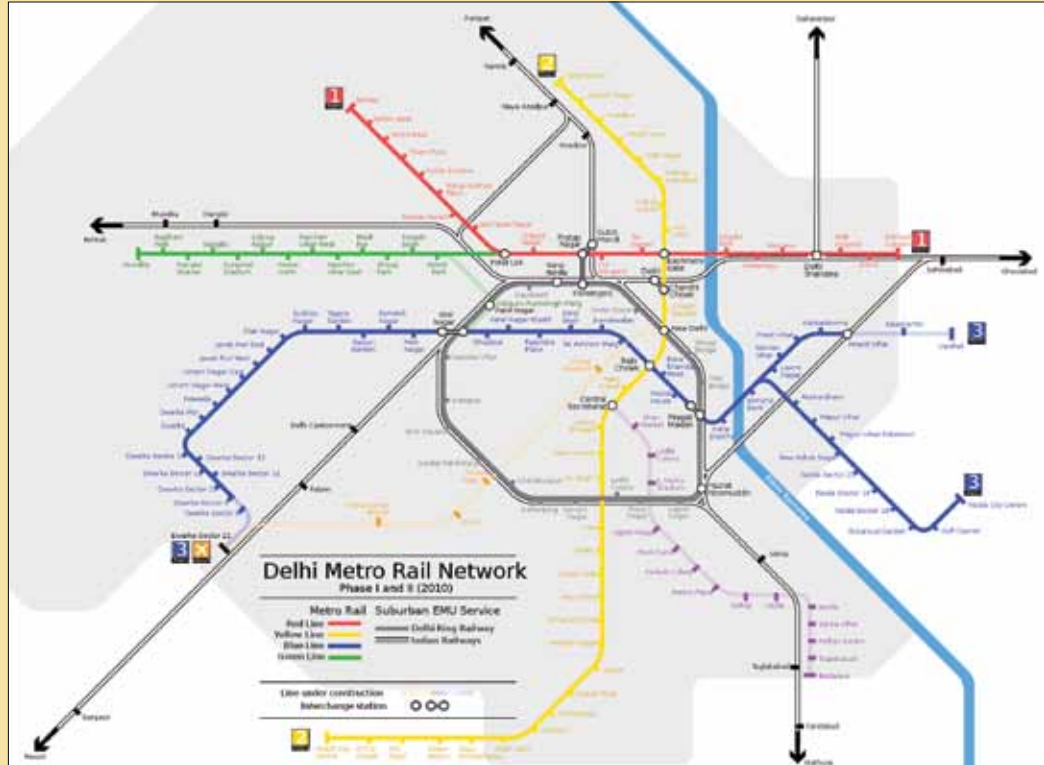
New Delhi Tops List of Cities Whose Drivers Would Rather Be Working

Percentage of Drivers Who Would Choose to Work More if Their Commute Time Could Be Significantly Reduced



Source: IBM 2010 Commuter Pain Survey.

New Delhi Is Rapidly Expanding Its Commuter Rail System



Source: Delhi Metro, 2008.

The national government recognizes its challenge and is committed to doubling infrastructure spending to \$1 trillion over the 2012–2017 period—or about 9 percent of GDP—after an average \$100 billion annual outlay since 2007. Officials hope that half the budget will be raised from the private sector, and they are engaged in an all-out marketing campaign to invite institutional infrastructure funds, investment banks, and development consortiums into the country to fund and build new highways, power plants, and airports. Activity has ramped up so much that an exchange-traded fund covering 30 companies was established in 2010 to trade in India’s infrastructure-related stocks.

Initiatives have been extensive and prodigious. Recently completed projects include an ultramodern subway line in New Delhi and a new metro rail system in Bangalore; new airports in Hyderabad and Bangalore, and a state-of-the-art airport terminal in New Delhi; extensive face-lifts to ports in Mundra, Reva, Gangavaram, and Krishnapatnam; and a slew of power plants across the country. The Transport Ministry, meanwhile, has set out an ambitious agenda to build 12 miles of road per day, or 30,000 miles over the next four years.

But progress is falling short in keeping up with India’s expanding population, which is nearly 1.2 billion and on track to surpass China as the world’s largest by 2025. Even upon opening, subway systems are straining to meet demand: newspapers praise the New Delhi metro, but lament how the city could use as many as 20 additional lines. Similarly, drivers immediately swamp new motorways in gridlock-like traffic and road projects muddle along behind schedule. Sewers and water lines take lower priority and remain distressingly underfunded.

Providing sufficient and reliable electricity remains a particular hurdle for a country that fosters promising but power-consuming high-tech industries. The government’s “Power for All” mission continues to fall short of its goal: experts estimate that India will need 160,000 megawatts of additional capacity by 2017, alone costing \$405 billion.

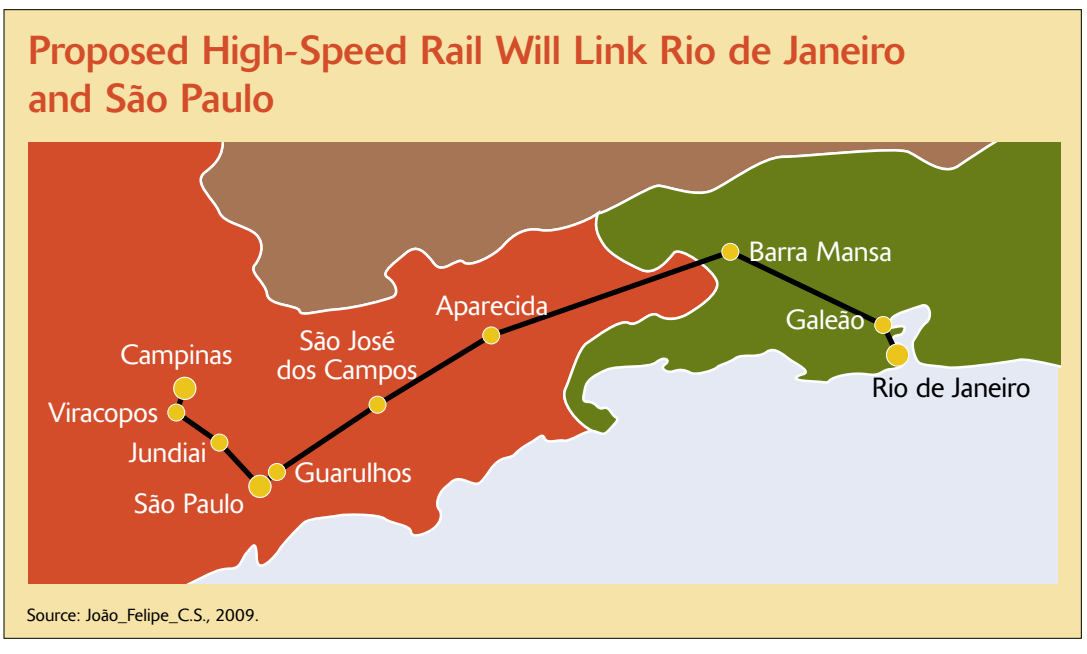
Foreign companies see opportunities operating ports, airports, and highway toll concessions, but get frustrated dealing with India's famously inefficient bureaucracy and with compromised central planning that leaves decision making to fractious and sometimes corrupt state governments. Prolonged court fights and arbitration battles can hamstring land acquisition, and contractor costs often balloon because of delays and other unforeseen obstacles. The country also lacks enough skilled electricians, carpenters, welders, mechanics, and masons to work on projects, creating scheduling snafus and boosting costs. In response, some operators import workers from China to fill the gap.

BRAZIL | Kicking into High Gear

An emerging market darling, Brazil has substantial growth prospects that may hinge on how fast its woebegone infrastructure can be upgraded. A 2009–2010 World Economic Forum survey rated the country's transport/electric/water systems among the world's worst. Only about one-seventh of Brazil's roads are paved; much of the highway between its two largest cities, Rio de Janeiro and São Paulo, is only two lanes; and a bus trip between Rio and Brasília, the country's capital, can take 17 hours. Port access remains limited because of poor roads and inadequate freight rail, hobbling the country's significant export potential, and current power production cannot support rapid industrialization.

Winning host rights to the 2014 World Cup and the 2016 Summer Olympics is helping kick the country into gear to capitalize on the fast-approaching global sporting events. In 2010, the national government committed to a multiyear, \$900 billion infrastructure plan, which includes a \$19 billion high-speed rail line from Rio de Janeiro to São Paulo, new power plants, hydroelectric dams, and port construction. Modern roads and new freight railways also will be part of the construction binge. Chinese companies are leading foreign investor forays by buying transmission lines, building factories, and developing new port facilities to help gain access to the country's vast commodities and natural resources.

In Rio, plans call for upgrading three major highways and creating bus rapid transit lines linking game venues, downtown, the suburbs, and Galeão International Airport, which will add new runways and terminals. The city plans to revamp its Porto Maravilha district by selling development rights and using an expected \$1.7 billion in proceeds to help overhaul lighting, streets, sewers, and water lines.



U.K. | Promoting Economic Infrastructure

For 2011, the new British government took a knife to spending plans, severely cutting defense, education, and social programs in an unprecedented austerity budget. School building, hospital renovations, and other “social infrastructure” also bit the dust. But one of the few areas leaders spared was economic infrastructure. The U.K. committed to a \$320 billion, five-year national plan to continue funding key transportation projects serving London; expand broadband access throughout the country; and jump-start sustainable, carbon-neutral energy initiatives, both wind and nuclear power. “The decision was surprising, but encouraging, and shows a clear national agenda with priorities to secure economic gains,” says an interviewee. “With a definitive strategy, now the private sector can gear up and get involved.”

The U.K. has an advantage of strong central-government planning for infrastructure policy, but until recently the country, like the United States, had neglected the sector and lived off major improvements completed during the post-World War II period. “People support the initiatives” and buy in on keeping the country economically competitive. “But they expect projects to come in on time and on budget,” and warily “remember the Chunnel cost overruns” as well as recent PPP snafus with privatizing railroads and refurbishing the London underground.

The highest-profile U.K. endeavor, fraught with engineering challenges, is Crossrail, Europe’s most expensive transportation project at \$24.5 billion. Scheduled for completion by 2017, this 72-mile passenger rail line will tunnel under central London from Heathrow, the continent’s busiest airport, to the city’s heavily populated eastern suburbs. In between, 37 stations will serve primary city destinations, including the burgeoning financial district around Canary Wharf. Links to subways, other commuter

U.K. chancellor George Osborne (left) and London mayor Boris Johnson visit the future site of a Crossrail station. (AP)



rails, and the Eurostar trains to Paris and Brussels should help temper traffic congestion in the country's economic center, facilitating connectivity and reducing travel times, as well as reducing car pollution.

In addition, the government has targeted \$12 billion for improving rail links from north and south of London into central-city stations with planned connections to the east–west Crossrail route. The infrastructure strategy also commits to moving ahead by 2015 with a high-speed passenger rail line north from London to Birmingham, with prospective spurs to Manchester, Leeds, and eventually Scotland. The High Speed 2 project, the nation's second bullet train line after the popular Chunnel Eurostar route to continental destinations, currently budgets \$52 billion for completion. Until now, the U.K. has trailed Germany, France, Italy, and Spain on building high-speed railways.

The U.K. has also lagged E.U. pacesetters in plans to reduce carbon footprints and provide broadband capability. But now, "energy is becoming a major priority," as the country, which has depended mostly on coal and oil, "looks to catch up and meet E.U. mandates for reducing emissions." The U.K. also wants to decrease reliance on other countries for cleaner energy sources, including Russia for natural gas and France for electricity from nuclear power. Electric vehicles are becoming part of the strategic mix, too, as the government looks at how to facilitate the buildout of a national network of charging stations. "This will be a sea change." On the broadband front, the policy goal calls for providing the fastest service in the E.U. by 2015.

While the government will front costs for the rail lines as well as maintenance upgrades on key road arteries, private financing will be crucial for the energy and internet connectivity initiatives. "It's somewhat unclear how the government will finance all the spending," says an interviewee. For starters, a new Green Investment Bank, capitalized with \$1.5 billion in government seed money, should help act as a catalyst for the energy agenda. "They need about \$23 billion in low-carbon projects, so it will be hard to leverage private sources up that high, but it's a start." Observers also expect more dispositions of public assets to private investors like the \$1.9 billion sale of the high-speed rail line from London through the Channel Tunnel. Canadian pension funds bought the line in November 2010.

The national plan places considerable emphasis on life-cycle budgeting and delivering on the "value for money" proposition. "It comes down to finding optimum models, proper procurement, and good design," says an interviewee. "The infrastructure plan looks for integration and efficiency between systems, rather than just funding massive programs." Particular attention will focus on streamlining process and speeding up execution. "They worked for close to a quarter century on Crossrail," says an interviewee, "and it took more than a decade to start Heathrow Terminal 5, wasting huge dollars along the way."

On wastewater management, the government makes a hard call, scrapping seven projects and looking for private funding to go forward with 11 others.

OTHER EUROPEAN COUNTRIES | Maintaining Strategic Priorities

Last October, the Swiss completed boring through the last stretch of what will soon become the world's longest rail tunnel, a 35-mile tube under the Alps in the heart of Europe. The \$10 billion project will help connect high-speed rail lines from Rotterdam, the Netherlands, to Genoa, Italy, and possibly halve the number of trucks barreling along mountain roads while speeding traffic flows and reducing environmental impacts. At the same time, France and Spain completed laying high-speed rail tracks over the craggy Pyrenees that will cut travel times between Paris and Barcelona to five and a half hours by 2013. Over the next decade, western Europe's commercial centers could be linked by a web of high-speed rail lines extending from northern England to Vienna and Naples.

Progress on engineering extensive high-speed rail and freight train systems is probably the most visible aspect of the E.U.'s ongoing trans-European transport network (TEN-T) strategy to connect the continent's transport networks—roads, rails, shipping lanes—a program not only aimed at increasing economic productivity, but also decreasing emissions of greenhouse gases. "Europe's getting much better joined up."

Across continental Europe, the struggling PPP market continues to improve, as new infrastructure funds are created and capital comes back into the market. And with €48 billion (US \$65 billion) in loan disbursements in 2009, the European Investment Bank (EIB) is continuing its integral role helping E.U. countries finance projects, attracting private investments and influencing the execution of a mixture of policy imperatives, including reducing fuel consumption, eliminating traffic bottlenecks, shrinking carbon footprints, and implementing new technologies. With economic recovery expected, the EIB budget may be lowered significantly going forward.

But most infrastructure spending on projects derives from national budgets, currently constrained by the fiscal hard times wracking most European nations, and 2009–2010 stimulus funding is beginning "to dry up." Countries and cities face tough choices. For example, work may have to be delayed on the long-planned Strait of Messina Bridge linking mainland Italy to Sicily. Budgeted at close to \$8 billion, the span would be the longest suspension bridge in the world. Spain has stopped or delayed almost 200 projects. In Germany, Stuttgart residents are protesting a €4 billion (US\$5.6 billion) project to replace the city's above-ground terminus station with an underground through-station to enable expansion of long-distance and regional rail service and reduce travel times. Amsterdam has cut its infrastructure programs by more than US\$1 billion (€690 million), typical of many major cities. Austerity impacts are even greater in eastern Europe, where countries like the Czech Republic, Hungary, and Bulgaria have no choice in shutting down road, rail, and wastewater projects. In addition, "a massive backlog of repairs" requires attention across the continent.

Despite this financial travail, European countries preserve infrastructure strategies in their economic game plans. "Spending is viewed as good for stimulating economies, providing long-term benefits as well as jobs, and most programs in place will continue to get funding."

As countries cope with crafting rational budgets, investment players expect governments to limit infrastructure cuts and seek more private financing for essential projects, which can provide solid long-term returns. European Investment Bank involvement can temper risk and sets guidelines for meeting investment hurdles, helping reduce financing costs and attracting more private monies.

Even Germany, an E.U. outlier by not embracing PPPs, may look to the private sector to help fill infrastructure budget gaps. Since 2007, several highway PPP projects have been successfully tendered in Germany. And a new wave of nearly a dozen highway PPP projects has already hit the market.

The German federal government, meanwhile, has committed €1.7 billion (US\$2.2 billion) to continue rail and light-rail programs for cities through 2014 and upgrade infrastructure in the former East Germany. The Germans also have made electric mobility a high industrial and infrastructure priority: becoming a global leader in car battery technology would enhance economic growth, while constructing a network of charging stations would help prepare for more widespread use of hybrid and electric cars. Therefore, the government is enhancing the country's electric grid network.

France, Spain, and Italy are continuing to expand their high-speed rail routes even if it means reducing worker pensions, shaving defense programs, and increasing taxes. In Europe, governments view infrastructure as a weighty priority. France in particular is ramping up efforts to facilitate infrastructure PPPs by providing government guarantees on bonds. "Belt-tightening doesn't mean we stop setting aside money."

AUSTRALIA | Floods Threaten Modest Progress

Aging networks and systems, mostly built in the post World War II era. . . . Increasing congestion in major cities impacts economic productivity and snarls traffic. . . . Under funding of infrastructure programs in recent decades appears to constrain growth prospects. . . . Lack of coordination between federal, state and local governments increases costs and discourages private investment. . . . Expert analysis points to needs for massive new investment well beyond existing budgets.

Is this a thumbnail description of U.S. infrastructure?

No, it is a summary of findings from a report by Engineers Australia in 2005 that graded the condition of the country's systems at an overall C+. (Coincidentally that year, the American Society of Civil Engineers published a more scathing scorecard on the condition of U.S. infrastructure, grading most systems D or worse).

But Australia's federal government took the engineers' findings as a bit of a wakeup call. By 2008, a national task force, called Infrastructure Australia, was formed to help set national priorities, identify regulatory reforms, and set guidelines for attracting more private capital. The group was also charged with recommending important projects that could meet the nation's objectives for propelling economic growth, promoting sustainability, and improving the quality of life. The government also created a modest

Australia's Port of Newcastle has the world's largest coal terminal but struggles to handle the heavy volumes of coal now coming through the port.



A\$20 billion (US\$20.2 billion) Building Australia Fund from budget surpluses for allocation to economically critical road, rail, port, and broadband development. Separate studies are underway for improving and integrating the nation's ports, freight hauling, and urban planning so that the country can attempt to accommodate projected population growth and commercial expansion.

So far, nearly A\$8 billion (US\$8.1 billion) has been budgeted from Building Australia for key projects across the country, from new roads and rail links in New South Wales and Queensland to preconstruction work on the Melbourne Metro and port expansion in Darwin. And a working group has made headway in creating a framework for PPPs that will help ensure more rigorous value-for-money analysis and consistent procurement policies for state and local projects seeking federal contributions.

In late 2010, a new Engineers Australia assessment credited the government for making progress and helping check further decline, though its overall grade for Australian infrastructure held at C+. But the report soberly pointed out that Infrastructure Australia had identified A\$83 billion (US\$83.8 billion) in nationally significant infrastructure projects necessary to reduce bottlenecks and relieve congestion, and that the country had a long way to go in making up for an estimated A\$700 billion (US\$707 billion) in previous underinvestment. "A C rating reflects infrastructure that is only adequate and in need of major changes; there is still much work to be done and we face major challenges," says the report.

Complicating matters, the country now must deal with recovering from the January 2011 Queensland floods, which devastated its third-largest city, Brisbane, requiring potentially tens of billions of dollars in repairs and replacements for destroyed roads, rail lines, and water and power systems. The damage likely will force the country to reorient its funding priorities, at least in the short term.

Queensland aside, Australian ports in particular require considerable new investment and expansion. A shortage of deep-water facilities and rail links could restrain export revenues from iron ore, coal, and other commodities desired by Asian manufacturing nations, led by China. The world's largest coal terminal, located at Newcastle, has trouble processing contracted volumes, and sometimes long ship queues form at other ports. Inadequate rail capacity on creaky lines from farm areas also delays harvest shipments into key harbor facilities for export.

Improving Australia's broadband network is another high priority: the country's internet speed ranks only 30th in the world. Dealing with endemic water shortages has forced development of expensive desalinization plants. An additional sore point festers in Sydney, the nation's largest city, where a series of proposed rail transit projects have fallen through, frustrating commuters seeking relief from horrific traffic congestion.

The flooding disaster, revised priorities, and political infighting could derail chances for marked progress on infrastructure needs—health and education continue to take precedence—and question marks hang over high-price-tag wish-list projects like the upgraded broadband network.

CANADA | Staying the Course, Ramping up PPPs

Using C\$16 billion (US\$16.2 billion) in recent stimulus funding, Canada is making headway in addressing issues of aging infrastructure. The country had underspent for decades after building new systems in the 1950s through the 1970s. The stimulus program augmented initiatives bolstered by a seven-year C\$33 billion (US\$33.7 billion) Building Canada fund, begun in 2007, which focuses on shoring up obsolescent transport, water supply, wastewater treatment, and airport facilities. In addressing its deficits, the federal government also remains steadfast in protecting infrastructure from the budget knife, viewing the spending not only as necessary to support future growth and productivity, but also as a short-term jobs creator at a time when unemployment rates have been uncomfortably high.

After "a sloppy start" ten years ago, Canada now also tracks ahead of the curve—and the United States in particular—in engaging and implementing public/private partnerships. "If you want to learn

about PPPs, go there,” says an interviewee. Canadian provinces and municipalities have successfully structured availability payment deals and used life-cycle budgeting with private operators to shift risks appropriately and drive down project costs. Policy also encourages using local and regional firms in contracting work, which creates constituent support for projects and provides an additional boost to local economies. A national council for PPPs, composed of government and private operators, has helped provinces find common ground on procurement and share best practices, creating “standardization and transparency about deals.”

But Canada still lags in getting its asset-rich public pension funds to invest in national infrastructure. “The funds can get higher [low-teen] yields outside the country when the government feels uncomfortable doing deals at high-single-digit yields. There’s a gap in expectations.” The investment of Canadian pension plans in U.K. high-speed rail lines in 2010 ironically highlights the lost opportunity: Canada has no high-speed rail and none is in planning.

Expanding mass transit, especially in Canada’s preeminent global gateway Toronto, will become a more pressing priority. After years of squabbling over building an extensive “Transit City” light-rail system from the northern suburbs, Toronto’s new mayor scrapped the above-ground network in favor of a single subway line, which opponents say would carry a fraction of the number of people at considerably higher cost. Toronto’s existing 43-mile rapid transit system serves nearly 1 million passengers daily, but the area’s expanding population is outgrowing road systems to surrounding suburbs, and locals complain of worsening Los Angeles-style traffic jams. In Vancouver, preparation for the 2010 Winter Olympics fortuitously enabled expansion of mass transit, including a new airport light-rail connection to downtown that attracts almost 100,000 riders daily.

A new rail line will link the port cities of Dubai and Abu Dhabi in the United Arab Emirates.



MIDDLE EAST | Cash-Rich Spending for the Future

From Libya to Abu Dhabi, Middle East energy states have been using oil proceeds to build out infrastructure in an attempt to modernize and diversify. But recent regime change and political tumult could sidetrack initiatives in some countries.

After constructing glittering new high-rise commercial centers literally on sand dunes, the United Arab Emirates is embarking on its latest big-ticket project—an \$11 billion, 930-mile railway between its two primary port cities, Dubai and Abu Dhabi. In the midst of near financial collapse following a wave of real estate overbuilding, Dubai has proceeded with completing a new airport and a network of roads and mass transit, as well as water systems.

After years of “underinvesting,” Libya had allocated more than \$100 billion to infrastructure for housing, utilities, and railroads, but those grand plans have been upended at least temporarily by the outbreak of civil insurrection. Kuwait and Saudi Arabia are also building out cities, and Qatar must prepare to host the 2022 World Cup. “In this oil-dominated region, many governments heavily subsidize carbon-neutral projects for the day when oil runs out.”

Securing and husbanding water necessarily takes on increasing importance as populations expand in parched desert cities, which try to attract more commerce. But heavy reliance on energy-intensive desalination plants raises environmental concerns—not only over carbon emissions, but also ocean pollution.

In Israel, water rates recently increased 40 percent to pay for higher energy costs related to desalination plants. The Israelis look to become a world leader in constructing an electric car recharging network, building out charging stations across the country. Short-hop driving distances make the country well-suited to use of electric cars, which can require battery charges after only 50 miles.

SOUTH AFRICA | Finding a Sensible (Bus Rapid) Transit Solution

Subways and rail lines can cost tens of billions of dollars to build, take many years to complete in disruptive construction programs, and require tens of millions of dollars more annually to maintain. Congested roads, meanwhile, sap productivity and contribute to rising pollution levels. How do cash-poor cities expand mass transit to help reduce traffic jams, improve mobility, and shrink carbon footprints while avoiding dislocating residents and businesses?

Around the world, more transport planners view bus rapid transit as a cost-efficient and effective solution—part of a multimodal mix for moving people through dense urban areas. More than 40 systems now operate in South America, Europe, Asia, Australia, and North America. Recently, Africa joined the list as Johannesburg, South Africa, opened the first phase of a \$2.2 billion system in time to transport crowds for the 2010 World Cup matches. Other cities, including Lagos, Nigeria, and Dar es Salaam, Tanzania, are also building or considering rapid bus lines to serve growing populations and enable economic growth.

The Johannesburg bus rapid transit (BRT) system, called Rea Vaya (“We Are Going”), was approved in 2006 in anticipation of the global soccer event. The first phase of 33 stations along 15 miles was operational just three years later and shuttled passengers between stadium venues. By 2013, the city anticipates completion of 150 stations and 72 miles of lines with an additional 150 miles of feeder routes stretching into suburbs, including regular bus routes, rail lines, and taxi/van connections. Over time, the objective is to create a seamless public transit network along 190 miles of roads, serving 430,000 passengers daily and conveniently reaching the 85 percent of the city’s 4 million people who live within blocks of trunk routes or feeder corridors.

Dedicated Rea Vaya bus lanes are built along existing primary thoroughfares. Riders buy tickets in advance at kiosks in enclosed curbside stations and load quickly into 122-passenger vehicles that arrive at three-minute intervals during rush hour and within ten minutes during off-peak periods. Buses have priority to speed through intersections, and control-room dispatchers track buses with real-time technologies and communicate with drivers in order to limit delays.

From a traffic-management perspective, Rea Vaya offers a relatively low-cost mass transit alternative and the ability to enhance bus service by providing efficiencies associated with light rail or subways, without the costs of laying tracks or building extensive tunnel systems. In helping reduce car traffic, the BRT could cut carbon dioxide emissions by 1.6 million metric tons by 2020, according to city projections. Rea Vaya should also help break down transportation barriers holding back economic advancement for people living in outlying black townships who had difficulty reaching jobs in and around the city's commercial districts. Officials also expect stepped-up commercial growth around stations along BRT routes.

Although BRT systems have flourished in emerging market cities in Latin America—including Bogotá, Quito, and Mexico City—as well as Bangalore, India, and Guangzhou, China, transit agencies throughout the United States had been slower to get on board with the concept, favoring premium rail approaches traditionally associated with first-rank urban centers. But confronted by a discomfiting combination of fiscal constraints and mounting congestion, U.S. cities now more readily embrace fast buses as a lower-cost mass transit solution. In fact, transit officials find compelling support for BRT concepts in a U.S. Department of Transportation study of Bogotá's highly successful TransMilenio system, which found that a 240-mile fast bus network could be constructed for the same cost as an 18-mile rail line. U.S. cities operating or implementing versions of BRT systems include Boston, Chicago, Las Vegas, Los Angeles, Miami, Seattle, and Washington, D.C., among others. Expect more to come.

Sbu Ndebele, South African minister of transport, celebrates with others at the official opening of Johannesburg's bus rapid transit system, Rea Vaya, in 2009. (AFP/Getty Images)







UNUNITED STATES

A train races by the city of Los Angeles. (Elena Segatini/Getty Images)





2 National Outlook

In 2011, “the U.S. effectively shrugs off infrastructure” in the face of escalating government deficits and cash-strapped taxpayers. Despite a welcome wave of political rhetoric about its importance to the country’s economic future and related worries about falling behind global challengers, a proactive U.S. infrastructure agenda remains buried underneath a long list of other budget imperatives—health care, Social Security, defense, public safety, and education, as well as the need to service the swelling government debt. No matter how desirable, ongoing investment in systems to keep the country competitive and functioning easily can get cast aside in the rush to plug budget leaks.

Calls for More Investment

National Surface Transportation Infrastructure Financing Commission

In *Paying Our Way: A New Framework for Transportation Finance*, released in February 2009, the commission estimates that the annual gap between transportation needs and current investment by all levels of government ranges from \$172 billion to *maintain* existing transportation infrastructure to \$214 billion to *improve* system performance.

American Society of Civil Engineers

In ASCE’s 2009 infrastructure report card, the organization estimates that investment of \$2.2 trillion over five years is needed to maintain and upgrade the nation’s infrastructure. For transportation, the projected need was \$930 billion over five years, or \$186 billion per year.

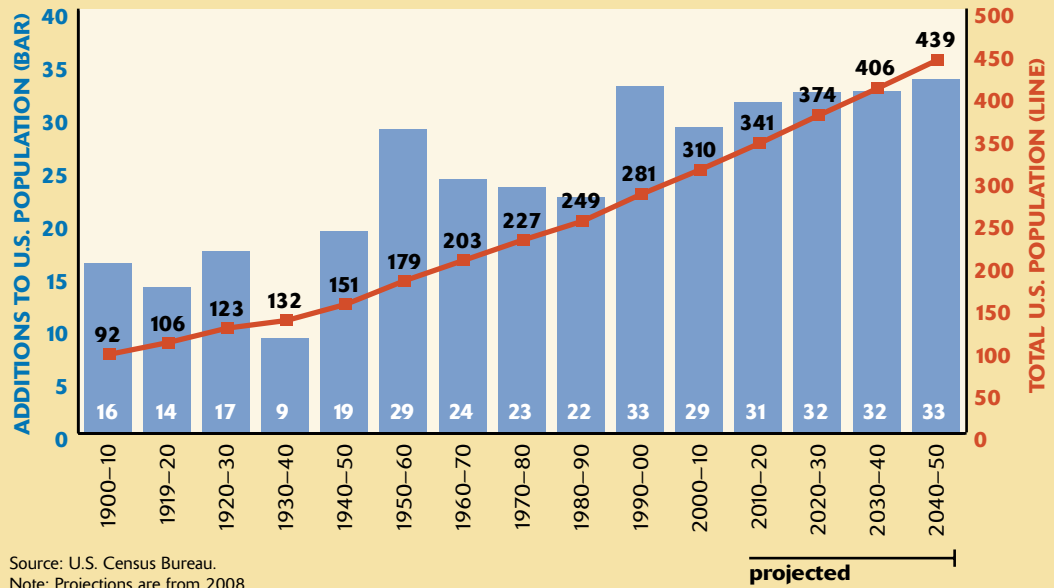
Miller Center of Public Affairs, University of Virginia

In October 2010, a report prepared by a panel of 80 experts and chaired by two former secretaries of the U.S. Department of Transportation estimated that an additional \$134 billion to \$262 billion must be spent per year through 2035 to rebuild and improve the nation’s road, rail, and air transportation systems.

The Phoenix Sky Harbor International Airport in Arizona is framed by city lights.

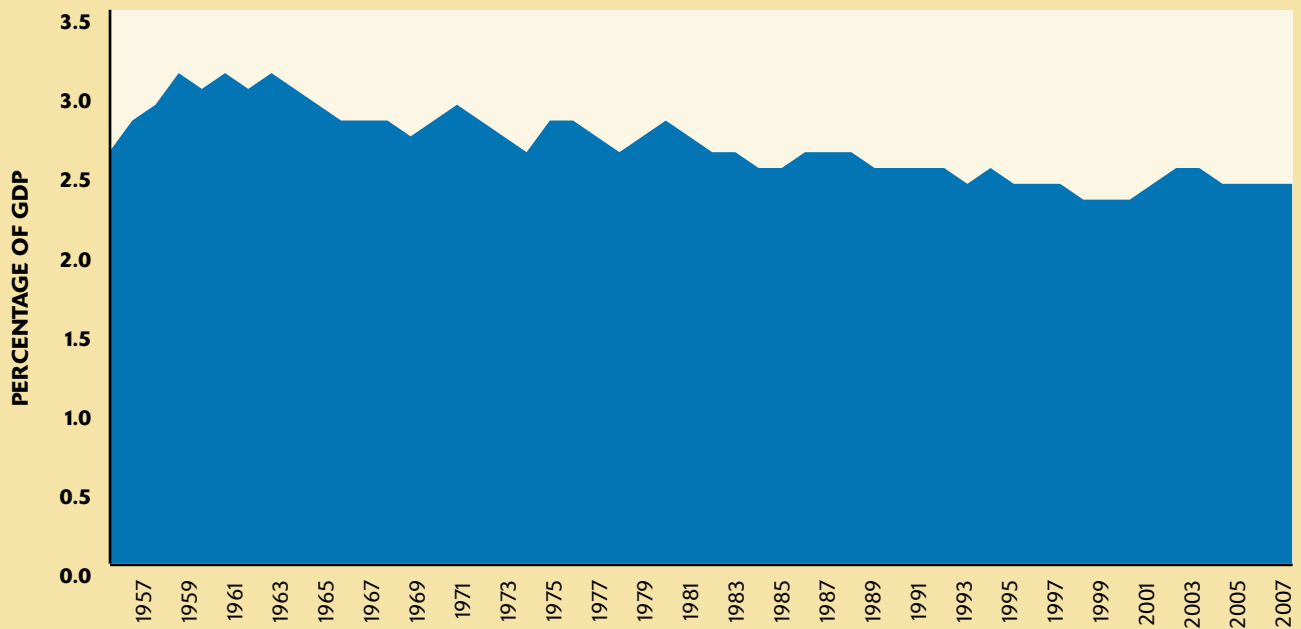
Every Decade between Now and 2050, More Than 30 Million People Will Be Added to the U.S. Population

U.S. Population Growth, Historic and Projected, in Millions



Infrastructure Spending as a Share of GDP Peaked at 3.1 Percent in the Early 1960s, and Declined to 2.4 Percent in 2007

Spending on Transportation and Water Infrastructure as a Share of U.S. GDP



Source: Congressional Budget Office, *Public Spending on Transportation and Water Infrastructure*, 2010.

Instead of finding more dollars to meet growing needs to serve a steadily rising population—census forecasts estimate there will be almost 100 million more people in the country by 2040—politicians likely will budget less (or not enough) and take their chances in the years ahead. This approach probably suits average Americans just fine. Their more pressing concerns revolve around holding on to or finding good paying jobs, making mortgage payments to stay in their homes, or keeping up with rising medical insurance deductibles.

As for infrastructure, it is easy to brush back numerous “the sky is falling” experts—“maybe the picture isn’t so bleak” since all those forecast disasters have not happened—and settle on a simple bottom line: “We have no interest in paying more.”

So now what?

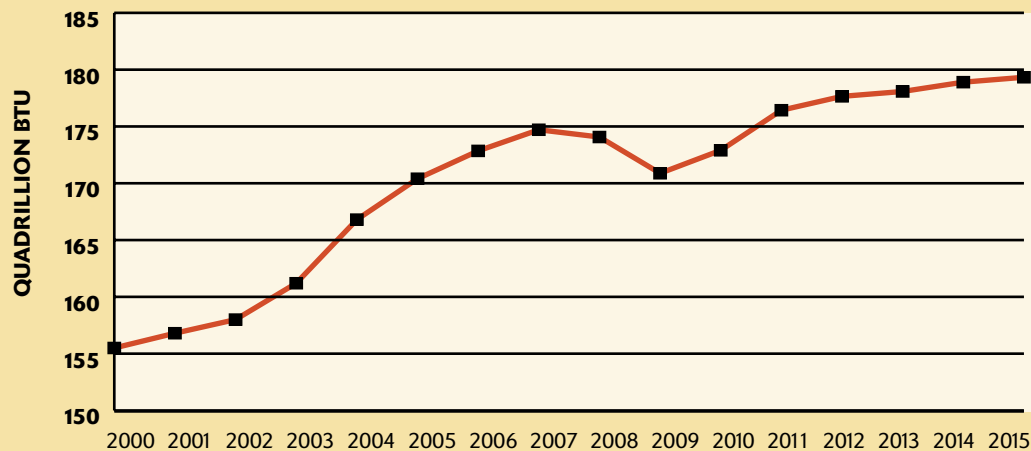
“All signs point to a period when we won’t invest sufficiently in infrastructure on any level—federal, state, and local,” says an interviewee. “There is no impetus and no money.” The idea of energizing the economy and creating jobs around rebuilding America finds little support despite some presidential jawboning. Instead, Americans believe it is better to avoid boondoggles, keep taxes low, and reduce deficits. And little momentum exists for creating a national infrastructure agenda and policy to inform how limited funds can be invested more efficiently and productively, or can help wean the country off foreign oil.

The consensus view of interviewees for this report is that the United States likely will wallow in this what-me-worry hiatus “until disaster strikes or our decline becomes too obvious to ignore.” So far, Hurricane Katrina and the New Orleans levee breach have not been a big enough wakeup call; neither was the 2007 Minneapolis bridge collapse. Perhaps higher gasoline and energy prices resulting from Middle East turmoil will do the trick and galvanize more support for mass transit systems and rail lines. Only time will tell what gets the country’s collective attention to force action. “It’s amazing how hard everyone is making it in the U.S.,” a Brit observes. And meanwhile, “the condition gets worse and worse.”

In the meantime, it’s the same old story: Congress perennially refuses to hike gasoline taxes even in the face of growing transportation capital and maintenance needs. The federal gas tax has languished at 18.4 cents per gallon since 1993 while improving fuel efficiency standards promise to deplete its revenue-raising power further and weaken the already-drained federal Highway Trust Fund, which provides funding to states for roads and mass transit.

After a Dip during the Economic Recession, Oil Use Will Climb Again from 2011 on, Putting Pressure on Prices

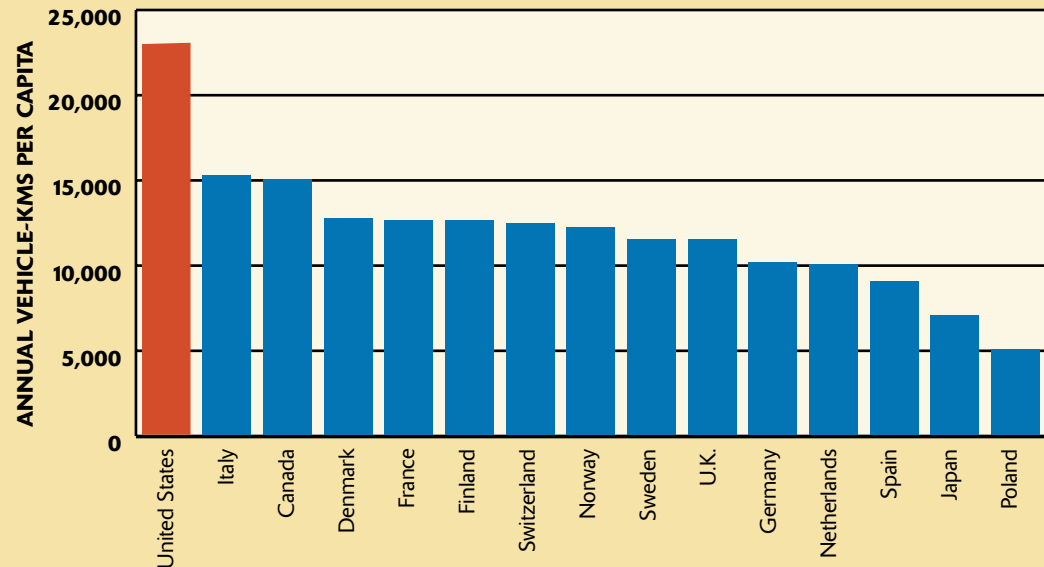
World Use of Liquid Fuels



Source: U.S. Energy Information Administration, *International Energy Outlook 2010*, 2010.
Note: Most liquid fuel use is oil.

U.S. Car Travel Ranks among World's Highest, Even When Compared with Other Wealthy Countries

Per Capita Annual Vehicle Travel by Country, OECD Countries, 2009



Source: Victorian Transport Policy Institute.

Note: OECD is the Organization for Economic Cooperation and Development.

More Responsibility Falls to Broke States and Cities

Congress's apparent inclination to curtail federal infrastructure funding will effectively push more of the cost burden onto already "budget-busted" states and local governments, "which can't afford to do much without federal help." Available federal funding, meanwhile, continues to favor capital projects rather than operations and maintenance.

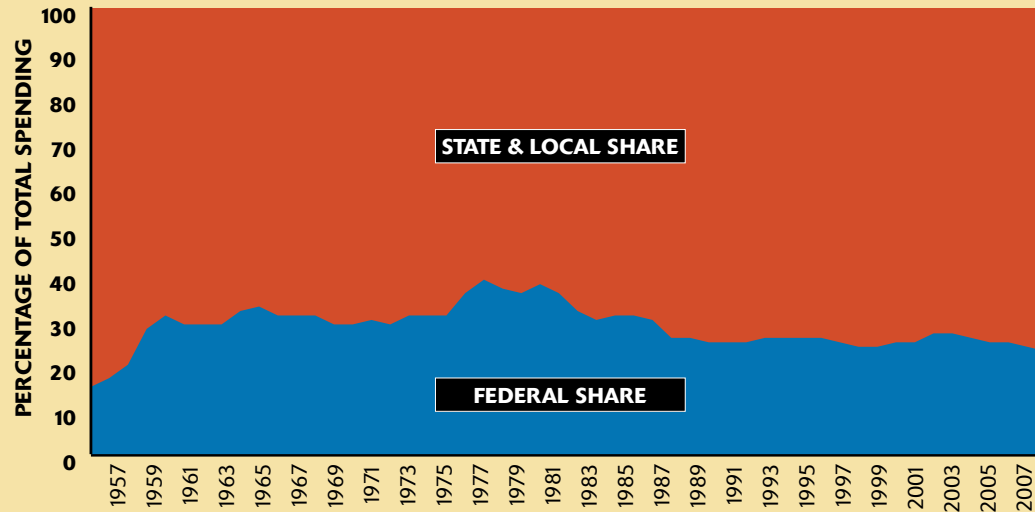
As a result:

- Road systems and water treatment plans built with federal grants 40 or 50 years ago reach the end of their life cycles, and now many counties and towns do not have the wherewithal to repair or replace them.
- Local governments often are left to grab for dwindling available federal capital project dollars when starved for maintenance and operational funding on existing systems.
- More states reject available federal capital funding, fearing future unfunded operating burdens.
- Some innovative plans to expand transit systems in car-dependent metro areas struggle to move forward; local governments and agencies cannot make up the difference as federal funds peter out.

Despite high hopes among proponents eager for the United States to catch up with the rest of the world, the nation's recently energized high-speed rail policy offers a case study of what is wrong with the current federal approach to spreading limited infrastructure funding across states and congressional districts for one one-off projects. A precious \$8 billion in stimulus seed money for high-speed rail lines was geographically allotted to key electoral states so that no region was ignored, rather than focused on two or three lines with proven economic benefits and well-conceived life-cycle operations budgets, and located in areas with multimodal regional transport plans. At this point, many of the original 11 targeted systems are not feasible because of prohibitive capital and operating costs, as

State and Local Spending on Transportation and Water Infrastructure Dwarfs Federal Spending; Federal Share Peaked in the Late 1970s

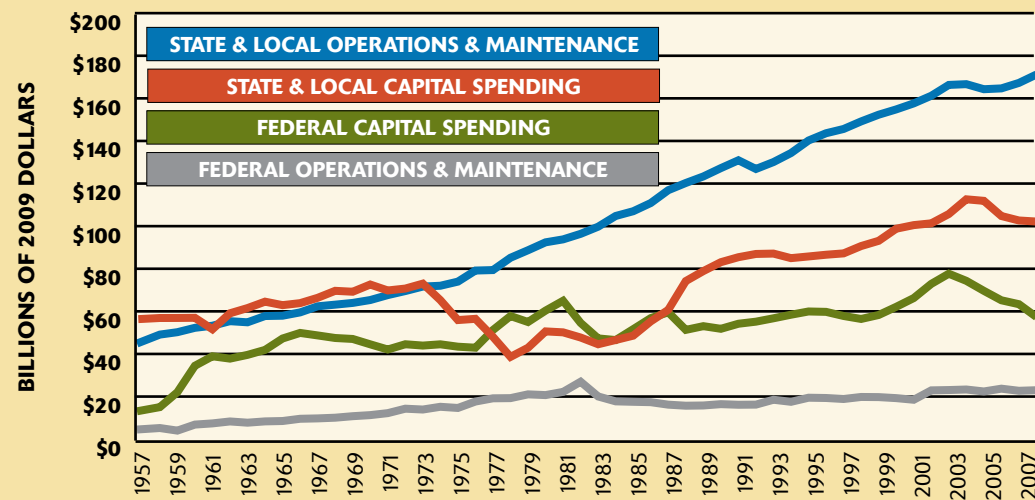
Share of Total Spending on Transportation and Water Infrastructure



Source: Congressional Budget Office, *Public Spending on Transportation and Water Infrastructure*, 2010.

State and Local Governments Pick Up Most of the Tab for Infrastructure, Especially Maintenance and Operations

Public Capital and Operations and Maintenance Spending for Transportation and Water Infrastructure, by Level of Government



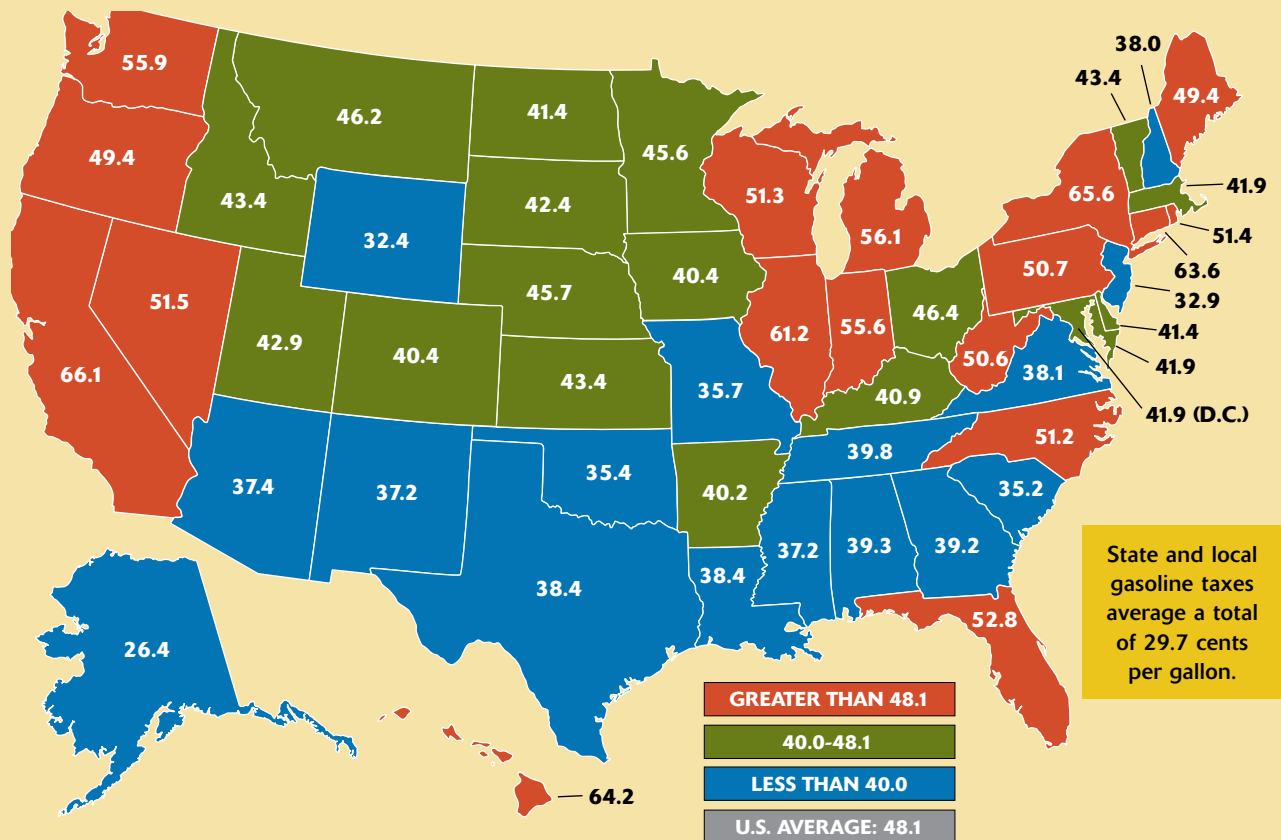
Source: Congressional Budget Office, *Public Spending on Transportation and Water Infrastructure*, 2010.

well as a lack of integrated transit systems to funnel enough riders into them. The most viable line—through the well-established Northeast passenger train corridor—would cost upwards of \$120 billion alone to build, according to new Amtrak estimates.

In the absence of federal policy guidelines and merit-based direction, many state and local agencies naturally gravitate to wherever they can latch on to federal dollars, which more often than not means going after pots of money for ad hoc capital projects. Despite widespread shortfalls in budgets for maintaining existing systems, California has snatched \$4.5 billion in seed money to help fund a high-speed rail line through its relatively underpopulated Central Valley (the first link in a San Francisco-to-San Diego line via the Los Angeles corridor); New York City is pushing forward with the on-again/off-again \$3 billion Moynihan Railway Station and the \$17 billion Second Avenue subway; and Chicago is pursuing a \$1.4 billion South Side extension to its heavily used Red Line elevated train. “The way you get federal dollars is to plan something new and sexy,” says an interviewee. “We begin to see a complete funding disconnect with maintaining existing systems, and no planning for how to operate new systems after construction. States like California are veering on the edge of a fiscal abyss and have no money to operate new facilities.”

The Federal Gasoline Tax Has Been Stuck at 18.4 Cents per Gallon since 1993, but States and Local Governments Generally Charge Much More

Gasoline Taxes—Combined Local, State, and Federal (Cents per Gallon)



Source: American Petroleum Institute, January 2011.

Short Term versus Long Term

Some state and local officials legitimately worry about funding infrastructure black holes and refuse to chase available federal dollars. “They willingly sacrifice long-term investments for balancing this year’s budget” and protect against future burdens for which they say they cannot risk taking responsibility.

Newly elected governors in Ohio, Wisconsin, and Florida forfeited \$3.5 billion in federal stimulus funds for high-speed rail, contending that their states could not afford the subsidies necessary to operate the projects once built. New Jersey’s governor torpedoed a new commuter-rail tunnel into Manhattan and lost \$4.5 billion in federal funding over apprehensions about potential cost overruns, which the state would have to pay.

Many governors and state legislatures face a choice between letting roads and bridges deteriorate further and facing expected political storms over enacting user fee propositions. After gauging constituent appetites for paying more, many elected officials choose more potholes and corrosion—even though costs will mount for inevitable future overhauls.

For many local leaders facing a clash between immediate needs and future benefits, the political calculus discourages taking any risk on expensive projects that will not be completed or have potential payoffs until years after they leave office.

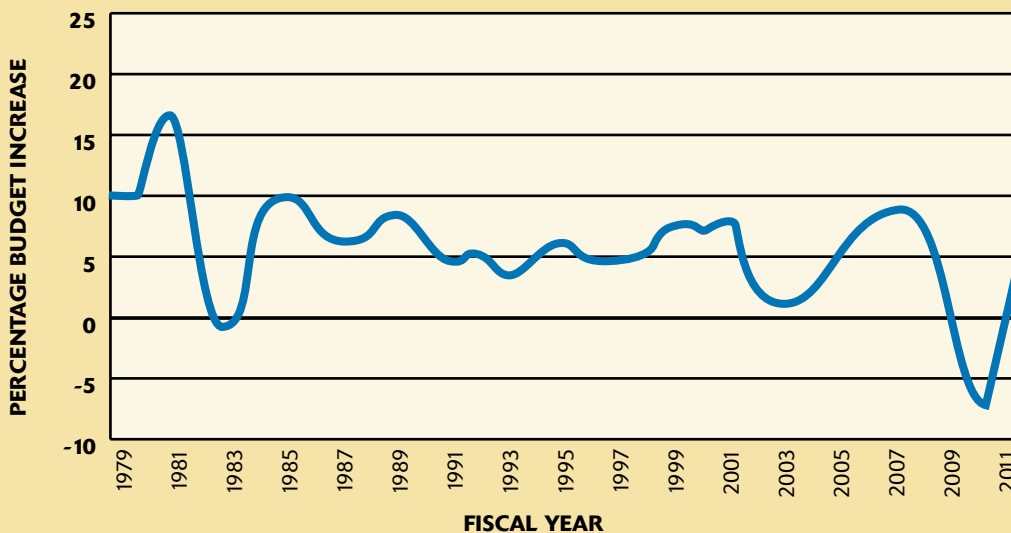
Stimulus: Setbacks and Gains

Interviewees lament how recent experience with the checkered federal stimulus program’s infrastructure components proved to be “an opportunity lost” and probably further damaged the political optics of the “infrastructure brand.”

Completed projects—quick-fix stimulus-funded maintenance like standard street paving, subway track replacement, and wastewater system improvements—might have been worthy and necessary, but they

Despite Stimulus Infusions, State Budgets Declined Sharply in 2009 and 2010, Though Modest Increases Are Expected in 2011

Annual Percentage State Budget Increases, Fiscal 1979 to 2011



Source: National Association of State Budget Officers, *The Fiscal Survey of States*, Fall 2010.

Many States Were Forced to Slash Funding Midyear: K-12 Education Hardest Hit, Transportation Fared Somewhat Better

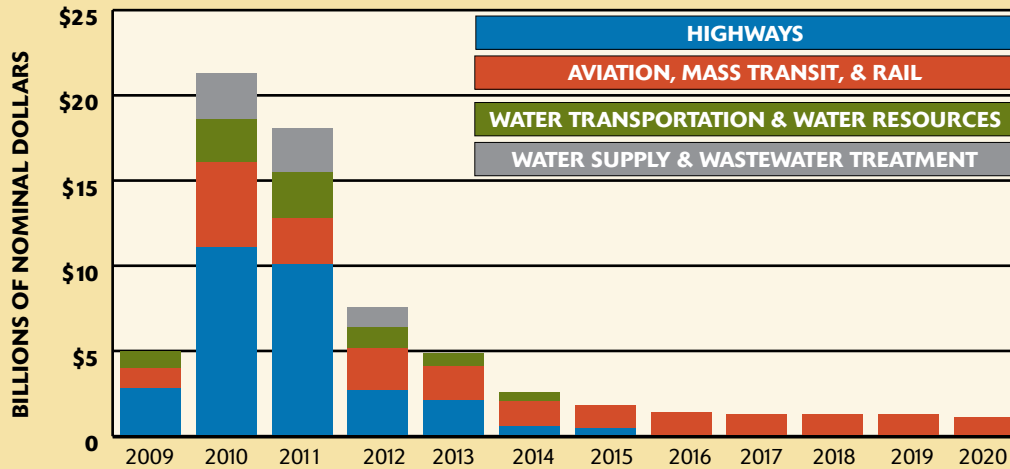
Fiscal 2010 Midyear Program Area Cuts

State	K-12 Education	Higher Education	Public Assistance	Medicaid	Corrections	Transp.	Other
Alabama	■	■		■	■		■
Alaska							
Arizona	■		■	■	■		■
Arkansas							
California							
Colorado	■	■		■	■		■
Connecticut	■	■		■			■
Delaware							
Florida							
Georgia	■	■	■	■	■	■	■
Hawaii	■	■			■		■
Idaho	■	■		■	■		■
Illinois	■	■	■	■		■	■
Indiana	■	■			■		■
Iowa	■	■	■	■	■		■
Kansas	■	■	■	■	■	■	■
Kentucky	■	■		■			■
Louisiana		■	■	■			■
Maine	■	■	■	■			■
Maryland	■	■	■		■	■	■
Massachusetts							
Michigan							
Minnesota	■		■	■	■	■	■
Mississippi	■	■		■	■		■
Missouri	■	■	■	■	■	■	■
Montana	■	■				■	■
Nebraska	■	■		■	■		■
Nevada	■	■			■		■
New Hampshire	■		■		■		■
New Jersey	■	■		■	■	■	■
New Mexico	■	■		■	■		■
New York	■	■		■	■	■	■
North Carolina	■	■	■		■		■
North Dakota							
Ohio							
Oklahoma	■	■			■	■	■
Oregon							
Pennsylvania	■	■		■	■	■	■
Rhode Island	■	■		■	■		■
South Carolina	■	■	■	■		■	■
South Dakota		■	■	■	■		■
Tennessee							
Texas	■	■	■		■		■
Utah	■	■		■	■		■
Vermont	■		■	■			■
Virginia	■	■	■		■	■	■
Washington	■		■	■	■	■	■
West Virginia	■	■	■	■	■	■	■
Wisconsin							
Wyoming							
TOTAL	35	32	20	28	31	15	37

Source: National Association of State Budget Officers, *The Fiscal Survey of States*, Fall 2010.

U.S. Stimulus Spending Peaked in 2010 and Will Decline in Future Years

Actual and Estimated Spending for Transportation and Water Infrastructure under the American Recovery and Reinvestment Act



Source: Congressional Budget Office, *Public Spending on Transportation and Water Infrastructure*, November 2010.

did not meet the public's inflated expectations for game-changing economic improvements. The unemployment rate remained uncomfortably high, and tangible benefits were hard to gauge. Taxpayers might have noticed a newly blacktopped street, but wondered what happened to the new bridge, high-speed rail line, or airport expansion they were expecting. Naysayers gained new ammunition over "another unfulfilled promise" by big government.

Lost in stimulus piñata bashing, infrastructure spending probably kept unemployment from rising higher, sustained some capital projects, enabled important repairs, and provided a lifeline to struggling public works agencies.

Business on the Sidelines

Surprisingly, many American corporations and local business groups also noticeably stand on the sidelines even though increasing congestion and risk of dislocation from deteriorating networks could hobble productivity, decrease revenues, and raise operating costs. A short-term focus on immediate shareholder returns and lowering corporate tax burdens apparently takes precedence over ensuring the country has adequate transport systems, energy networks, and logistics facilities for businesses to compete effectively in the decades to come. At some point, more companies may realize that participating in rebuilding efforts and developing new systems could be a tremendous economic driver and profits generator. "It's time for businesspeople to become partners and lead. Citizens and politicians need to hear from them."

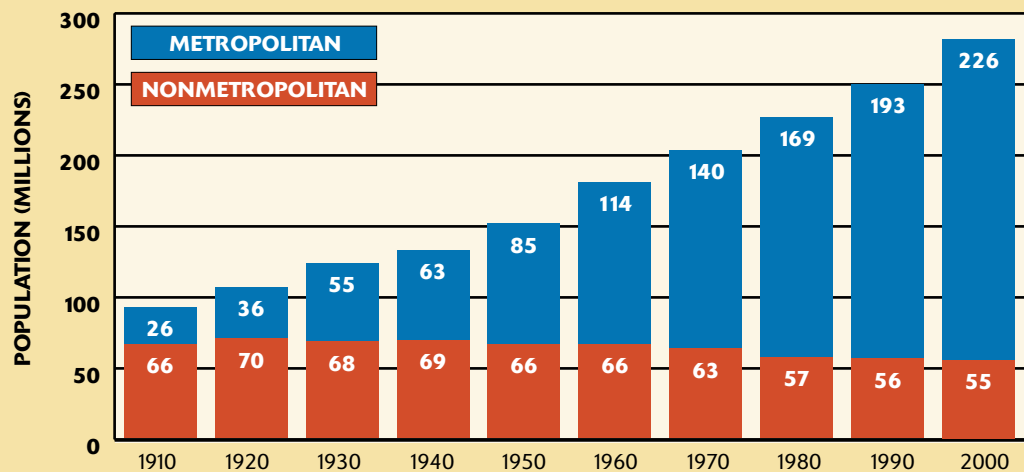


3 Metro Outlook

The following appraisal of U.S. metropolitan areas highlights how fiscal exigencies during 2011 could short-circuit government efforts to repair aging infrastructure, especially in older 24-hour cities, and delay construction of transit in Sunbelt suburban agglomerations just as political support had begun to galvanize for light-rail projects as essential for sustaining future growth. These centers concentrate U.S. economic activity and attract a significant majority of the nation's growing population.

Since 1950, Most Americans Have Lived in Metropolitan Regions, and the Metro Share of the U.S. Population Continues to Grow

Population in Metropolitan and Nonmetropolitan Areas, 1910–2000



Source: U.S. Census Bureau, *Demographic Trends in the 20th Century*, November 2002.

The Washaba Street Bridge in St. Paul, Minnesota, lights up the skyline at dusk.
(Walter Bibikow/Stone/Getty Images)

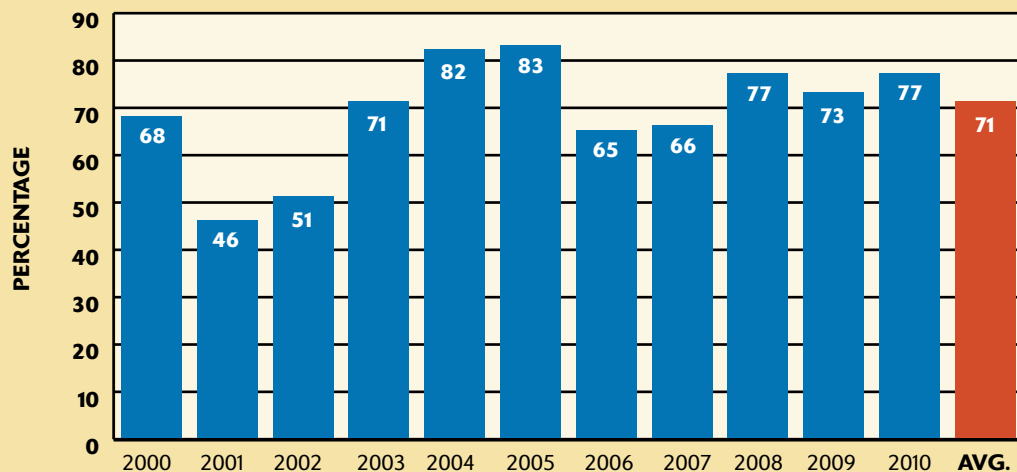
If transportation, water, and power systems become further compromised in meeting burgeoning demand, business expansion and productivity could be severely affected. Officials are scrambling for dollars to fill shortfalls and grudgingly slowing down or postponing projects where necessary.

Among the evident trends:

- **LESS FEDERAL FUNDING THREATENS PROJECTS.** As stimulus funds run dry and Congress plans budget cuts, many infrastructure capital projects on the drawing boards could be stopped in their tracks or delayed. Federal funding accounts for nearly 40 percent of capital spending for road and transit projects. Local officials are keeping their fingers crossed about federal funding commitments and must become more resourceful in holding deals together.
- **LOWER SALES TAX REVENUES CONTRIBUTE TO TRANSIT TROUBLES.** High unemployment and anemic economic recovery crimp sales tax revenues, which many local governments—including Seattle, Denver, and Charlotte—had targeted for building out rail corridors. Cities in states that do not provide gasoline tax revenues or general fund support for mass transit really feel the pinch. Phoenix, Dallas, and Atlanta are taking further hits.
- **AGING INFRASTRUCTURE CHALLENGES OLDER CITIES.** Older cities—including Boston, Philadelphia, Chicago, and San Francisco—retrench on new projects and still come up short on budgeting for necessary repairs. They must make difficult triage decisions, including service cutbacks and fare increases for transit systems.
- **SHARED APPROACHES REAP SOME DIVIDENDS.** Metropolitan areas where local governments pool resources and gain consensus in planning and spending strategies—including Denver, Minneapolis, Seattle, and Salt Lake City—have a better chance of achieving at least some of their objectives and can better prioritize projects.
- **MULTIPLE AGENCIES CREATE CONFLICTS.** Multistate regions with multiple agencies in control of infrastructure budgets typically have more trouble prioritizing initiatives and work at cross-purposes. Schisms become more problematic in places like the New York metropolitan area.
- **PUBLIC/PRIVATE PARTNERSHIP NUMBERS RISE.** More states latch on to PPP models to finance new projects and raise revenues, following the lead of Virginia, Florida, and Texas on roads and Denver for light-rail investments. More cities can be expected to try to follow Indianapolis’s lead in

The Public Has Voted in Support of the Majority of Transportation Measures on Ballots

Percentage of Transportation Ballot Measures Approved by Voters



Source: Center for Transportation Excellence.

figuring out how to sell parking concessions and to generate revenues from other assets such as government buildings and ports. Toll roads and high-occupancy toll (HOT) lanes will become more familiar along the interstate landscape.

- **CONSTITUENTS MUST BE CONVINCED.** States, counties, and cities can benefit when their leaders and constituents determine they have more to gain through a concerted effort to plan and pay for infrastructure improvements, either through higher user fees, sales taxes, or creative funding solutions with private operators. Voters usually pass referendums for new projects, though some initiatives rely on pushing out costs to future taxpayers through bond issues.

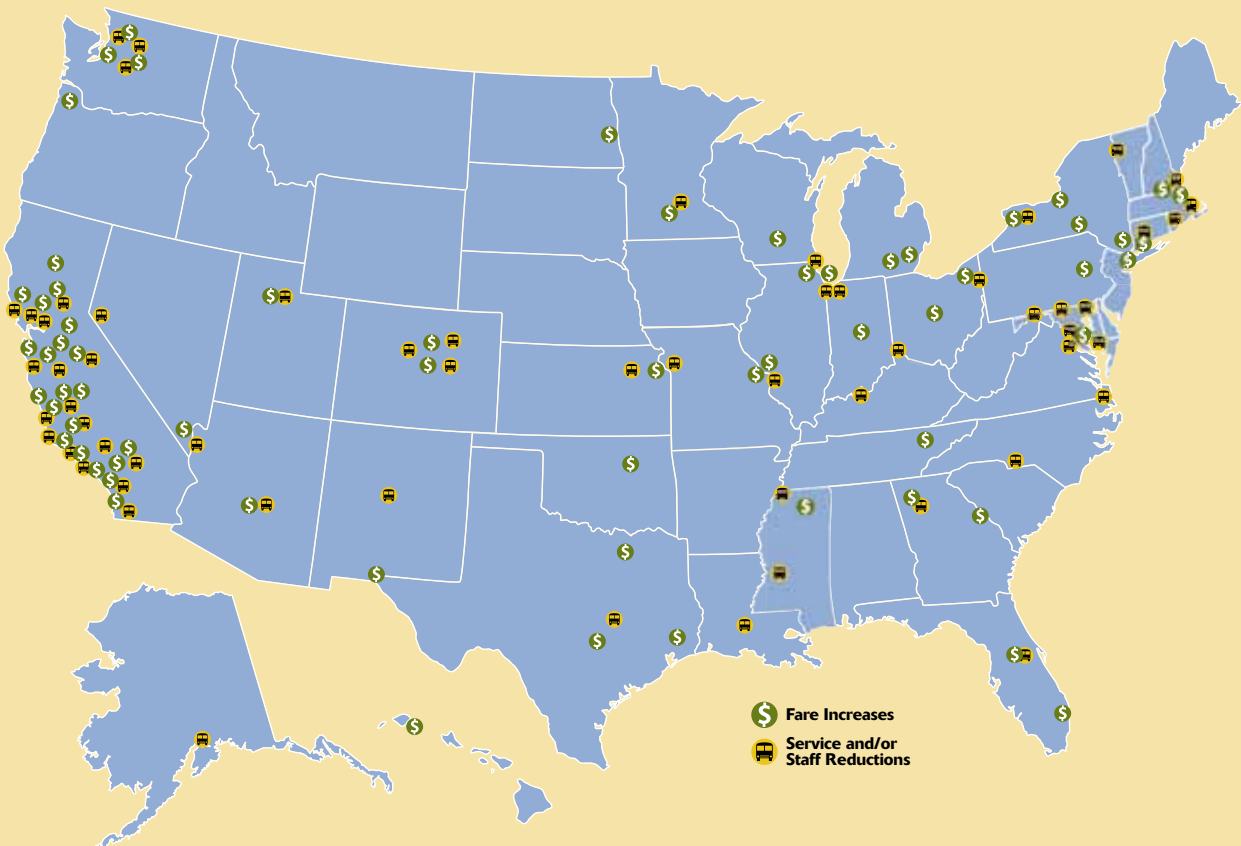
ATLANTA | Good Intentions

This high-growth region, which for decades fueled its expansion with federal road subsidies, now wrestles with how to refurbish its lifeblood aging highways and realize aspirations for augmented mass transit despite dwindling resources. Officials have applied for any available state and federal funding, and look to add managed toll lanes on select area highways to increase revenues. But like many other metropolitan areas, Atlanta, hampered by stove-piped funding sources, is straining to fashion multimodal solutions to remedy congestion and sustain continued population growth.

Late in 2010, the city won a \$47 million federal stimulus grant to develop a downtown streetcar route, connecting with the Metropolitan Atlanta Rapid Transit Authority (MARTA) subway system, just as

Transit Systems across the Country Face Challenging Times

2009 Fare Increases, Service Reductions, and Staff Reductions (Enacted and Proposed)



Source: Transportation for America, *Stranded at the Station: The Impact of the Financial Crisis in Public Transportation*, August 2009.

MARTA was forced to reduce subway and bus service and increase fares to close a \$100 million deficit in its \$450 million operating budget. As often happens with service cutbacks and fare hikes, MARTA ridership levels declined immediately, threatening to exacerbate revenue shortfalls and deplete the system's reserves by 2013. Transit-averse rural legislators, meanwhile, are complicating efforts to find solutions by blocking state funding for MARTA and spreading transportation dollars to backwater counties,



limiting Atlanta's take despite the city's overarching economic importance to the state and region.

MARTA's problems will not help alleviate the area's significant highway congestion, which is made worse by necessary repairs to roads and overpasses reaching the end of their life expectancies. A fortuitous federal rebate lets Georgia fund repaving of the heavily pitted Interstate 285 ring road north of the city, but in winning the streetcar grant, Georgia lost out on federal monies for two proposed HOT lane additions to Atlanta interstates. Officials are pinning their hopes on these managed lane strategies to reduce traffic and raise money to help offset losses from more severely limited federal highway programs. In a vicious circle, paying for lane construction becomes more difficult without the federal aid, so the state looks to become a leader in attracting private operators through PPP deals.

The city is also in procurement for a massive \$320 million multimodal passenger terminal to serve as a hub for bus and rail service around the city. The facility will have room for 400 buses and eight tracks for MARTA, as well as commuter and intercity passenger trains.

The city continues to assemble a proposed network of parks, trails, and transit lines to connect 45 neighborhoods in a 22-mile Beltline corridor loop. The ambitious 20-year project promises to recast the metropolitan core into a more pedestrian-friendly environment with enhanced public green space and mass transit alternatives to lower car dependency.

After reservoirs almost ran dry in a 2007 drought, Georgia has become a national leader in water conservation measures, and per capita water use has declined 10 percent, according to local officials. The state recently passed legislation enabling water PPPs. The metropolitan water authority plans to mandate installation of meters with point-of-use leak detection to allow residents to monitor water use almost to the drop and give utilities early notice of leaks. Conservation certainly helps, but Atlanta also needs to gain access to new reservoirs to sustain its growing population. These expanded water systems will cost hundreds of millions of dollars; not surprisingly, water bills are increasing to help pay for all the necessary improvements—from meters to land acquisition.

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In Atlanta, traffic congestion is severe and may increase as the region's population grows. (Dennis Flaherty/Photographer's Choice/Getty Images)



BOSTON | Living Off Good Fortune

Boston got lucky: the \$14.6 billion Big Dig project will go down in history not only for its notorious cost overruns, but also as the last vestige of the nation's amply funded interstate highway building boom. Locals may debate whether the network of underground tunnels around the city's financial district improves traffic flow: studies show bottlenecks have moved away from downtown to now-jammed connectors into the new underground arteries that also link to Logan Airport. Nevertheless, no one misses the unsightly highway overpasses that once bisected the city's harbor area. And because of the massive project, completed in 2007, Boston's primary inner-city highways are probably in better condition than those of any other metropolitan area in the country. Without the Big Dig, Boston's roads would be in a bigger hole: the Massachusetts Turnpike and other major interstates leading into the city require life-cycle overhauls.

Boston's biggest concern involves mass transit and how to allocate resources increasingly limited by federal cutbacks. The choice boils down to investing as much as possible in new systems to help reduce congestion and car dependency, or shoring up the city's T subway/rail system, the nation's oldest underground, which began operating in 1897. A 2009 report found that the Massachusetts Bay Transportation Authority (MBTA), the T's operator, confronts a \$230 million structural deficit and \$543 million in unfunded safety-critical projects. Like other underresourced metropolitan transit authorities, the MBTA will be hard pressed to make all necessary upgrades and repairs, even while sharply scaling back plans to expand service.

On MBTA drawing boards since 1995, a \$2.6 billion Urban Ring bus network, designed to convert upwards of 41,000 daily car trips to transit alternatives, was scaled back dramatically last year. Certain bus rapid transit routes will be implemented, but the remainder of the plan—to create a circumferential transit corridor around the city—got tabled when the federal government signaled funding cuts from the depleted Highway Trust Fund. Officials say that without the Urban Ring, existing Boston transit lines will be seriously over capacity by 2030. Another high priority, a \$1 billion bus tunnel extension for the Green line, looks more problematic, and extension of the Silver line has been sidelined.

With a price tag of \$14.6 billion, Boston's Big Dig project will go down as one of the most expensive urban highway projects in U.S. history.

CHARLOTTE | Shortfalls Derail Transit Plans

Like many other sprawling Sunbelt cities, Charlotte recognizes the need for mass transit alternatives in order to overcome mounting congestion in its rapidly growing car-dependent environs. In 2007, the city opened its first and only light-rail line, financed by a half-cent sales tax, and projected adding six other transit corridors—light rail, bus rapid transit, commuter rail, and streetcars—that would radiate from a downtown hub into sprawling suburbs. But the grand plan hit the skids in late 2010 when the regional transit agency tabled two projects—a BRT corridor and a \$450 million airport streetcar line—while sending two others, a \$1.2 billion extension of the existing light-rail route and a new \$375 million commuter-rail corridor, into underfunded limbo.

If Congress comes up with sufficient monies or a private partner surfaces, the light-rail extension may be able to proceed in an abridged form, but prospects look more doubtful for the commuter-rail project, which does not meet federal ridership requirements. Meanwhile, bus service expansions were also canceled. Not to look a gift horse in the mouth, the city won a \$25 million federal grant for a 1.5-mile uptown circulator streetcar line that was much lower on its transit priority list. The lost momentum on the 2030 Transit Corridor system ironically coincided with the rise of passenger numbers on existing lines to over 100,000 rides daily, more than double 2000 levels.

In another local setback, a high-occupancy-vehicle (HOV) lane conversion to managed toll lanes on I-77 struck out on a federal stimulus grant, jeopardizing the \$50 million project.

Charlotte's light-rail system began operation in 2007 with daily ridership of 21,000 passengers—a figure that exceeded the system's ridership projection for 2025.



Major Chicago PPP Deals, Completed and Attempted

Deal	Description
Chicago Skyway Toll Bridge	In 2006, the city signed a long-term, multibillion-dollar contract to privatize management of the Chicago Skyway Toll Bridge. The Skyway Concession Company received a 99-year operating lease for the tollway from the city for \$1.8 billion. In return, the company received the right to toll and concession revenues and is responsible for operations and maintenance costs.
Chicago downtown parking system	In 2006, \$563 million was paid to the city by Morgan Stanley in a 99-year concession lease deal to operate parking garages containing more than 9,100 spaces under two city parks.
Parking meter concession	In 2008, the city partnered with Chicago Parking Meter LLC, a consortium managed by Morgan Stanley, to handle the operations and maintenance of Chicago's parking meters for 75 years. The consortium made an upfront, lump-sum payment of \$1.2 billion to the city. Meter prices rose sharply after the deal was completed, sparking public outrage.
Midway International Airport	In 2009, the city attempted to execute a deal to privatize operations and management of Midway Airport via a 99-year lease. Midway Investment and Development Company LLC had offered the city \$2.5 billion but failed to raise enough funds to complete the deal due to the worldwide economic crisis. After retiring existing debt on the airport, the city would have netted \$1 billion. The city did manage to keep \$126 million paid by the investors. The city continues to pursue privatization of the airport.

CHICAGO | Taking a PPP Breather

Under former mayor Richard Daley, Chicago led the nascent movement by some U.S. cities into privatizing infrastructure assets but received decidedly mixed reviews. The Skyway Toll Bridge concession raised \$1.8 billion for a 99-year lease, but the city was criticized for using proceeds to fill current funding deficits instead of for long-term infrastructure improvements. A \$2.5 billion privatization of Midway Airport fell through when the proposed operators could not finance the transaction during the 2009 credit crisis. And the highly controversial sale in 2008 of the city's parking meter concession for \$1.2 billion over a 75-year term led to widespread public rebuke over sudden rate increases and more short-term budget sleight of hand. For 2011, local officials are retreating from further privatization efforts and are hunkering down to ensure that a range of improvement projects get completed in the sketchy funding climate.

The Chicago Transit Authority spared riders fare increases and service cuts, but pared back immediate plans for major capital improvement projects. A top priority remains the \$1.4 billion, six-mile extension of its Red line L train to underserved far South Side communities; the agency secured \$285,000 in federal planning money for an environmental impact study to keep the project moving forward.

The transit authority also won an \$11 million federal grant to help restart a widely touted bus rapid transit program that derailed in 2008 when the city lost \$153 million in federal monies for missing a deadline. The agency also needs a total of \$193 million to roll out its full-bore, four-corridor BRT plan as prospects dim for help from Washington.

A \$300 million restoration and rebuilding of heavily trafficked Wacker Drive—both street-level and underground sections—began in January, with completion scheduled by 2012. The 55-year old roadway at the heart of the downtown Loop carries 60,000 vehicles daily.

With money running out and facing challenges from airlines that do not want to pay higher landing fees, the city council approved a \$1 billion bond issue to keep the O'Hare Airport expansion and renovation on track. Begun in 2005, the \$6 billion project adds and reconfigures runways and develops new terminal space with an objective of increasing airport capacity by 60 percent and decreasing delays by 80 percent. O'Hare, one of the world's busiest airports, anchors Chicago's status as a gateway destination.



The region has been plagued by freight bottlenecks and freight/passenger conflicts for decades. A \$3 billion efficiency program bundles together dozens of projects in a major regional initiative designed to address freight challenges.

The city is continuing two monumental water district programs—replacement of about 70 miles of water mains and pipes annually, and the 30-year buildout of a giant sewer overflow system with complicated connections of reservoirs and tunnels for storing 17.5 billion gallons of waste. The sewer project has cost about \$3 billion so far and will not be completed until 2019.

DALLAS— | Big Projects, FORT WORTH | Some Private Dollars

Interlaced by highways with spaghetti-junction interchanges, the Dallas–Fort Worth Metroplex serves as the Texas transportation hub, boasting one of the world’s busiest airports. But in a big energy state ruled by the car, Dallas is trying to refashion itself, becoming a Sunbelt leader in retrofitting light rail onto its expansive suburban agglomeration and using managed toll lanes to temper roadway congestion. Projects underway could nearly double the local rail system’s reach to 90 miles of tracks over the next three years, including a planned extension to Dallas/Fort Worth International Airport. At the end of 2010, the local transit authority opened the final leg of the 28-mile, 20-station Green Line, connecting southeast and northwest Dallas, funded by a 1 percent sales tax collected in 13 jurisdictions throughout the Metroplex. Texas also is making strides as a national leader in PPPs, financing and building managed toll lanes in the Dallas area. In 2010, two managed lane deals for the Lyndon B. Johnson Freeway and the North Tarrant Expressway closed with projected development costs totaling \$7 billion.

Tractors demolish Chicago’s Wacker Drive as part of a \$300 million restoration project to rebuild the busy street. *(Rick Sinkuler)*

Starting with projects long on their wish lists, local officials want to untangle the kinked freeway web and aptly named Mixmaster interchange, which bottlenecks access to the center of Dallas. They also want to rebuild faltering levees along 20 miles of the Trinity River south of the city, transforming area road systems and creating a world-class urban recreational park with hiking trails, bike paths, and a restored hardwood forest.

Some of these Texas-sized, multibillion-dollar plans will run into familiar new-age funding obstacles—federal budget cuts, a sizable state budget deficit, and depleted sales tax revenues. In a state with no income tax and a prohibition against using gasoline taxes for transit, lawmakers look to apply gas tax revenues to schools and other expenses when the state highway fund cannot keep up with road funding needs. Light-rail projects in development count on federal matches, while road and levee projects will go nowhere fast without hefty federal assistance. The area's bold retooling could run short of fuel for a while.

DENVER | FasTracks Hits Speed Bumps

In the vanguard of America's fast-growth, car-dependent regions, the Denver area realized the importance of developing a transit network to mitigate future congestion and promote urban vibrancy. Beginning a decade ago, the city joined with surrounding suburban governments to form a regional transportation district that is building out a planned 122-mile commuter- and light-rail system with a downtown Denver hub located at the city's historic Union Station. The \$710 million first leg of the FasTracks system—a 12-mile, 12-station West Corridor line—is scheduled for completion in 2013, and the \$500 million Union Station renovation and expansion project is progressing toward a 2014 finish date.

Denver's Union Station is poised to become the region's transportation hub, linking new FasTracks bus and rail lines, bicycle facilities, Amtrak, and more. (Courtesy of Denver RTD)



Prospects for the rest of the bold \$6.7 billion project hang in the balance of making up an estimated \$2 billion shortfall and keeping costs from escalating further; the system's original price tag was under \$5 billion. Cost overruns create fodder for critics who slash at FasTracks "boondoggles," but speculators have not helped either, bidding up land prices around rights-of-way. A \$2.4 billion train line to Denver International Airport has funding with the help of a PPP consortium, but other lines, including the North Metro commuter train, do not.

Regional cooperation has buttressed FasTracks. Suburban districts see opportunities to increase tax revenues around transit-oriented development at station sites, and local leaders promote the environmental benefits and convenience of providing alternatives to car-only transportation in a state with a heavy green conscience. Ultimately, voters may need to decide whether to extend and increase local sales taxes dedicated to fund the entire system. The region also hopes for additional federal contributions on top of the \$1.4 billion already committed. Attracting additional private partners offers another possible solution. Under any circumstances, completion of the full network is delayed, currently to 2018, and some legs may be mothballed until funding becomes available.

DETROIT | Two Projects Offer Hope

Before year-end, beleaguered Motown could break ground on a 3.4-mile light-rail project along its main drag, Woodward Avenue. Thanks to \$125 million in backing from local philanthropists, this first stage of a proposed \$450 million transit corridor is attracting provisional support from the state and federal funders looking to extend a lifeline to Detroit, which separately is pondering

The Detroit skyline is reflected in the Detroit River. *(Joseph Stevenson/Flickr/Getty Images)*



eliminating basic services to vast uninhabited swaths of the city. Leaders hope development around stations along the line can eventually attract more middle- and higher-income residents to neighborhoods around downtown, which remains the headquarters of major employers like Ford and General Motors. Prospectively, the line would reach 8 Mile Road, the city's northern boundary. Not surprisingly, the project faces familiar 2011-style hurdles: the state's yawning budget deficit, which slackens the appetite for funding capital projects, and diminished prospects for additional federal infusions.

At \$5.3 billion, Detroit's other infrastructure priority—a second bridge to accommodate growing truck traffic moving across the Canadian border—is causing sticker shock in the state legislature but has the support of the new governor. Canada has begun building a \$1 billion toll road connection into the proposed bridge site on its side of the border and has even offered \$550 million in financing to help Michigan fund its share of the project. The Detroit–Windsor, Ontario, border is the busiest vehicle crossing between the United States and Canada, serving both countries' primary manufacturing regions, and powerful local unions claim the project would create thousands of jobs in an employment-starved state. But where's the money?

The new bridge initiative highlights what can happen when a private operator of a monopoly road concession confronts the possibility of a competing project. Not surprisingly, the Detroit International Bridge Company, which manages and collects tolls on the existing Ambassador Bridge and does not want any competition, is using its legal and political muscle to sideline the government plan and lobby for its own proposal to build a second bridge. The longer the delays, the longer the company can maintain its monopoly on the valuable border franchise.

HOUSTON | Light-Rail Plans Try to Get Back on Track

Despite an early history of crashes and continuing local opposition from antitransit groups, Houston's initial foray into light rail has proved a relative success. The city's 7.5-mile Main Street corridor rail line attracts about 40,000 passengers daily, the second-highest ridership per track mile in the country after Boston's Green Line.

Now, the Metropolitan Transit Authority hopes to build the nation's first non-hub-and-spoke light-rail configuration, with four new lines and an extended Main Street corridor crossing and interconnecting with each other. The design reflects mobility patterns in this multi-urban node suburban agglomeration and could serve as a model for similar metropolitan areas like Phoenix, parts of southern California, Atlanta, and Dallas that have no predominant city centers. But potentially costly missteps have delayed the start of construction and earliest completion until 2014; the agency lost \$900 million in federal grants by not complying with Buy American guidelines for the system's rolling stock. Political leaders, including the city's congressional delegation, are lobbying to regain funding in a much less hospitable, post-stimulus budget environment. And, in a bid to raise funds to supplement fares and sales tax revenues, the city is considering converting 84 miles of existing HOV lanes into managed toll lanes.

When the public experiences the impacts of deteriorating infrastructure directly, they are more willing to dig into their pockets to correct problems. That happened in Houston last November. Street flooding helped convince enough voters to narrowly pass a drainage fee referendum that will fund repairs on the city's deteriorating sewer and roadway infrastructure. Over a 20-year period, the new monthly taxes, averaging about \$5 per homeowner, would raise about \$8 billion for new storm drains and related flood control systems. By some estimates, 65 percent of the city's drainage and street infrastructure has passed its useful life.

INDIANAPOLIS | A Boost for PPP Proponents

Chicago's controversial 2008 parking concession agreement gave Indianapolis pause, but the city entered into a 50-year deal at the end of 2010 with a private operator anyway, having absorbed valuable lessons from the Chicago experience. Instead of taking a large upfront lump-sum payment (Chicago's was \$1.2 billion for a 75-year lease), Indianapolis receives only \$20 million initially and will share in revenues over the life of the contract, putting the estimated potential take at \$360 million to as much as \$620 million.

Critics had argued that the Chicago transaction essentially eliminated any chance for the city to share in possible windfall profits and gave up revenues needed to cover the cost for future infrastructure repairs, which the next generation of taxpayers will bear. While that will not be the case in Indianapolis, opponents calculate that the private operator could take in more than twice as much revenue as the city over the contract term, with the burden falling on city parkers. Proponents argue that the private operation will make more for the city than would a municipally run system, while it also upgrades and replaces 35-year-old meters with state-of-the-art equipment. Time will tell how well the partnership works.

For PPP operators and investors, the Indianapolis transaction provides a welcome breakthrough and offers a more palatable approach for partners to share in gains. "Chicago left a bad taste in everyone's mouth," says one interviewee, and stalled other potential deals. Only a few weeks before approval of the Indianapolis deal, Pittsburgh rejected a private parking concession in a proposed \$450 million transaction designed à la Chicago to fund the city's immediate public pension shortfalls. Notably, though, the Indianapolis agreement, along with other deals being considered around the country, provided a new model for a parking concessions.

The city also has completed the Indianapolis Cultural Trail, a downtown bike and pedestrian path that connects neighborhoods and entertainment amenities into the entire central Indiana greenway system. A public/private collaboration of the city, local foundations, and not-for-profit organizations funded the \$50 million project.

LOS ANGELES | Moving Beyond the Car

People easily forget that Los Angeles once had one of the most extensive public transport systems in the country—a crisscross of trolley cars and electric railways—before freeway mania took hold in the 1950s and dismantled the network. Now emboldened and fortified by a half-cent sales tax surcharge approved by Los Angeles County voters in 2008, the region is moving ahead with development of a modern network of subways, light rail, and bus rapid transit that could help transform lifestyle choices and land use patterns over the next two decades in this traffic-clogged West Coast gateway.

Four major projects have begun or will start soon, setting the stage for dramatically expanding L.A.'s existing 79-mile system of subways and light rail lines. They include:

- a nine-mile extension of the Purple Line subway west of downtown along heavily traveled Wilshire Boulevard, the commercial heart of west Los Angeles;
- an 8.5-mile light-rail route, which will help link downtown to Los Angeles International Airport and neighborhoods in between;
- an 11-mile extension of the Gold Line subway east of Pasadena; and
- a light-rail line from Santa Monica on the coast, running east to Culver City and tying into a link from downtown.

Officials project that the sales tax increase could raise \$40 billion between now and 2038, sustaining further transit expansion and eventually building out the system to reach neighborhoods and business

districts throughout the sprawling region. A reliance on more above-ground light-rail and BRT lines will help dollars go further than would expensive tunneling for subways. Using anticipated sales tax revenues as collateral, the city also is attempting to garner low-interest loans from the federal government in order to telescope construction schedules in an effort to reduce project delivery costs by as much as \$4 billion.

At present, the fixed-rail network serves about 300,000 rail riders daily, while buses carry about 1.2 million passengers. Most of Los Angeles County's 10 million residents still have limited transit options and depend on cars to get around. Over time, the additional transit lines could begin to give the L.A. rail network the scale and reach to ramp up ridership and relieve pressure on the infamously congested roadways, as well as encourage transit-oriented retail and apartment development around new stations. Add in the possibility of connections to the prospective high-speed rail line along the Pacific Coast, and mass transit proponents could get giddy about the changing landscape in southern California. Despite concerns about Washington funding cutbacks, which could jeopardize various federal loans and slow down construction schedules, Los Angeles appears committed to evolving beyond its 20th-century car culture.

MIAMI | Using Public/Private Partnerships to Construct Major Projects

Miami is already the world's busiest cruise port. Now the region wants to become one of the East Coast's most important cargo destinations and is competing for federal funding to dredge its harbor to accommodate post-Panamax-sized container ships (see sidebar, page 62). It is bolstering its case by beginning construction of a new \$1 billion tunnel to provide direct truck access from the seaport to key interstates. Twenty years in planning, the Port of Miami Tunnel project has been on again/off again, hampered by both an inability to get funding and inflated construction budgets, which elevated the blood pressure of local leaders. Design/build snafus routinely stymied financing plans and throttled various construction teams.

But an innovative PPP arrangement—involving risk sharing, life-cycle budgeting, and availability payment structures—brought down costs and won approvals, gaining a combination of federal, state, county, and city funding, as well as private sector financing. The PPP agreement between the Florida Department of Transportation and a private consortium of international companies not only involves design and construction, but also financing, maintaining, and operating the three-mile tunnel and causeway extensions over a 35-year term. Local authorities settled various right-of-way issues, giving contractors a clear path to estimating project costs and enough confidence to take the risks of meeting construction schedules and budgets.

Government availability payments also help reduce project risk and could lower development costs. "The Port of Miami Tunnel could be used as a model for using availability payment structures to help bring a consortium of funding and engineering expertise together to devise a less expensive project," one interviewee says. The tunnel completion date in 2014 coincides with the opening of a widened Panama Canal, which will increase shipping traffic from Asia to East Coast ports. Besides speeding container traffic out of the city, the tunnel should keep trucks off downtown streets and reduce traffic congestion.

The tunnel is one of three mega-transportation infrastructure projects underway in south Florida. The others are the \$1.7 billion Miami Airport Intermodal Center and the \$1.8 billion reconstruction of Interstate 595 in Broward County. The Intermodal Center aims to improve airport access, reduce vehicular congestion, and provide metro rail service from downtown. The I-595 project, which is building reversible managed toll and BRT lanes along the 13-mile highway north of Miami, ranks as

the nation's first transportation PPP concession to use an availability payment structure. Like the tunnel project, the 35-year term agreement is touted by officials as an exemplar for financing costly infrastructure improvements and managing costs from design and construction through operation and maintenance.

MINNEAPOLIS— | Pooling Resources ST. PAUL | for Light Rail

The Twin Cities are building the long-planned \$957 million Central Corridor light-rail project, an 11-mile transit route connecting the two downtowns, which is Minnesota's second-largest infrastructure project after the existing Hiawatha Line, a 12.3-mile light-rail line extending from downtown Minneapolis to the suburb of Bloomington. Construction has begun along part of the corridor, with the federal government contributing half the needed money. After the election defeat of former local U.S. Representative James Oberstar, who headed the House Transportation Committee, and possible cuts to transit funding by the new Congress, help from Washington may be less certain.

The local Metropolitan Council, which leads the formulation of the region's infrastructure agenda, has made the Central Corridor line a major priority for improving mobility through the cities' most heavily trafficked districts. The council is a consortium of county and municipal governments that oversees regional planning and operation of infrastructure, housing, and parks. Unlike disconnected policy making in many other U.S. metropolitan areas, the Met Council "helps break down silos and connects transportation and land use." The council has forged agreements among stakeholders and secured rights-of-way across jurisdictions to facilitate the Central Corridor project, and the region may be more likely to achieve its funding goals because of its ability to pool resources among local governments. "We know [federal agencies] can't drive it. It's a matter of all of us coming together to get things done in this environment."

While local officials push the Central Corridor's cause, they may be forced to set aside other desirable rail projects until the overall funding environment improves. Those jeopardized lines include a Southwest Corridor light rail from Minneapolis to Eden Prairie, the Northern Lights Express passenger rail from Duluth to the Twin Cities, and an extension of the Northstar commuter rail to St. Cloud.

NEW YORK | So Many Needs, CITY | So Many Agencies

America's pre-eminent 24-hour, gateway city boasts some of the country's most efficient and well-planned infrastructure, as well as some of its oldest and most badly in need of repair. Whether to build new infrastructure or repair the old is a question grappled with by an agency hodgepodge in a three-state region. Perhaps not coincidentally, officials in segregated bureaucracies appear to have disconnected visions and priorities.

Important bridges like the Tappan Zee Bridge (between Westchester and Rockland counties) and the Pulaski Skyway (linking Staten Island to New Jersey) are wallowing in a state of near obsolescence, and the entrance to the New Jersey side of the Lincoln Tunnel requires a major overhaul. The Metropolitan Transit Authority (MTA), meanwhile, is moving ahead with tunneling for the \$17 billion Second Avenue Subway, and the city is building a new downtown transit-rail hub at the Ground Zero site. At the same time, the MTA is eliminating subway lines, increasing transit fares, and pondering whether to extend the seven-subway line across the Hudson River as a substitute for the Access to Region's Core (ARC) Tunnel rejected by New Jersey's governor. New York state, meanwhile, is constricting its highway budget and telling municipalities to expect less aid for road overhauls.

NEW YORK–AREA BRIDGES

Running Out of Time

It is not that states and cities are failing to spend substantial amounts of money on transportation infrastructure projects. Their problem is keeping up with overwhelming life-cycle obsolescence, political resistance to raising taxes and tolls to help fill funding voids, reduced state revenue resources, and the prospect of declining federal aid.

New York is a prime example. At year-end 2010, the comptroller's office announced that more than 40 percent of the state's roads and bridges are considered substandard or obsolete, despite the state allocating \$63 billion to transportation infrastructure projects over the past decade.

Concerns about the Tappan Zee Bridge

Dire fiscal realities have pushed New York into triage decision-making mode, as well as paralysis. In 2009, the consequences of deferred maintenance led to the closing and demolition of an unsafe bridge over Lake Champlain to Vermont, forcing drivers—3,000 vehicle crossings a day—in this rural region on a 90-mile detour or a ferry with limited winter hours. Now the two states have no choice but to spend \$70 million on a new bridge, and the inconvenience is choking local businesses and farmers in the meantime.

But what happens if the Lake Champlain Bridge experience is replicated downstate on one of the Northeast's most important interstate routes? State officials have wrestled for years over what to do with the 56-year-old Tappan Zee Bridge, which carries 140,000 vehicles daily over the Hudson River just north of New York City. ULI's *Infrastructure 2007* report noted the two-mile cantilever span had exceeded its engineered life span "and needs substantial reconstructing or replacement." Not surprisingly, a \$14.5 billion proposal to replace the bridge five years ago has increased in cost to more than \$16 billion while the governor and legislature figure out where to get the money for the project.

Engineers monitor the Tappan Zee Bridge's rust and wear, while the New York Department of Transportation patches and performs stopgap maintenance, spending nearly \$150 million during 2010 to 2012 just to keep the span functioning. But the bridge is operating very much on borrowed time, and if it closes suddenly, the economic consequences could be catastrophic for the entire New York metropolitan area, which already struggles with congestion on its other Hudson River crossings. Where would those 140,000 cars and trucks go? What happens when commuters cannot get to their jobs? In this case, ferry service will not help.



New Jersey Bridges

Next door in New Jersey, 202 bridges have been labeled deficient, including the Pulaski Skyway, a major link connecting New Jersey Turnpike traffic into New York City via the Holland Tunnel. New Jersey's Transportation Trust Fund is rapidly running out of money, sapped by debt service payments on past projects and political opposition to raising the state gasoline tax, which is one of the lowest in the nation. So does New Jersey raise its gas tax and increase bridge tolls, or does it roll the dice and delay billions of dollars in necessary repairs on deteriorating assets?

In states across the nation, politicians take their chances, and inevitably the public will pay an escalating price. The question is how much and when.

Replacing New York's Tappan Zee Bridge will cost \$16 billion.

The nearly \$600 million the Port Authority of New York and New Jersey planned to spend on the \$3.5 billion commuter-rail ARC Tunnel may be redirected to replacement of the Lincoln Tunnel entrance, new cables on the George Washington Bridge, or a long list of other capital needs. How the money gets spent ultimately will be influenced by what New York's governor wants to do. One Port Authority project moving forward is the \$1 billion replacement of the dilapidated Goethals Bridge between New Jersey and Staten Island; notably, the Port Authority is moving forward with an availability payment-based PPP procurement.

Bottlenecks at New York's three airports can create delays across the entire U.S. air traffic control system. Despite a major increase in flight volumes, only one new runway has been built since the early 1970s. Hemmed in by surrounding infill development and water, the airports cannot easily expand. The Port Authority and the Federal Aviation Administration claim that GPS tracking technology would help reduce spacing between planes and shoehorn more flights in and out of airports. But the national Next Generation project has hit delays, and air traffic controllers still rely on less-than-state-of-the-art radar systems—technology dating from the 1940s and 1950s.

New York is struggling with its water infrastructure, too. The city continues to prepare for one of the most expensive single infrastructure repair jobs in the country by constructing a \$1.2 billion, three-mile bypass tunnel to divert flows from a badly leaking section of aqueduct that supplies New Yorkers with drinking water from upstate reservoirs. The bypass project, scheduled to start in 2013, will take six years to complete. The aqueduct leaks up to 35 million gallons daily, and a state comptroller's report has criticized the city for not having an adequate plan to protect against an even more serious rupture.

OKLAHOMA CITY | Downtown Investments

In the American heartland, Oklahoma City is looking to add momentum to its urban resurgence, capitalize on its strategic location as a gateway to Texas and Mexico, and make the most of its position as an energy hub. The decision to relocate Interstate 40 and tear down the old elevated expressway near downtown is sparking new thinking about the future of the central city districts. To build the needed infrastructure, the seven-year Metropolitan Area Projects 3 (MAPS 3) program funds eight transportation and infrastructure projects, including a new streetcar and downtown park—key components of the city's ambitious redevelopment plan that will help connect downtown to the river. MAPS 3 is funded by a one-cent sales tax approved by voters in December 2009, which will raise nearly \$800 million.

The city is also using tax increment financing tied to construction of a new energy company headquarters—one of the tallest buildings under construction in the United States—for wholesale upgrades to downtown streets, sidewalks, parks, and plazas. Though these initiatives are funded, other priorities face challenging times as budget woes affect state and city alike.

PHILADELPHIA | Paying for Repairs

Former Pennsylvania governor Ed Rendell has been one of nation's leading advocates for reinvestment in America's infrastructure. A study by the Road Information Program released late last year shows why. Almost three-quarters of roads in the Philadelphia region of southeast Pennsylvania are rated as being in poor or mediocre condition, and half the region's more than 4,300 bridges are structurally deficient, including heavily traveled spans like the Chestnut Street Bridge over the Schuylkill River. Lower mileage efficiency, time lost in traffic tie-ups, and damage due to potholes and crashes cost the average Philadelphia-area motorist close to \$1,500 annually, or \$8.2 billion a year for all area motorists, according to the study.

Like other states, Pennsylvania is falling farther behind in repairing and replacing these deteriorating transportation systems. Entering 2011, the state showed a \$3.5 billion gap between available funding dol-



lars and identified transportation needs. Rendell struck out in efforts to raise badly needed monies by selling a Pennsylvania Turnpike toll concession to a private operator in 2008 and to place tolls on another key east–west interstate, I-80, in 2010. However, the Southport port concession deal is moving forward.

Pushed to the wall, Pennsylvania may be ripe for state lawmakers to pass enabling legislation for PPPs to help finance infrastructure projects or to revise its requests for interstate tolling authority from the federal government. But the new governor has pledged not to seek approval for raising the state’s gasoline tax, a nonstarter with legislators.

PHOENIX | Transit Roadblocks

After opening its first 22-mile light-rail line to Mesa in 2008, Phoenix has been bitten by the rail bug: 40,000 riders use the trains each day, and passenger volumes are steadily growing at double-digit annual rates, well above original estimates. The city has expansion plans for as many as six additional lines covering 35 miles in a trunk and branch system. Local planners talk about how apartment and retail development around stations will establish a more high-density urban environment and help transform the metropolitan area’s sprawling landscape.

But then reality sets in: not enough money has been identified to pay for any of the new projects. The starter line cost \$1.4 billion, with 40 percent of the money coming from the federal government and the rest from local sales taxes. Fares only cover about one-quarter of operating expenses, which are subsidized by sales taxes that declined by nearly 40 percent during the economic downturn. The now-depleted sales tax coffers were also pegged to pay for the extension lines in conjunction with ample federal grants and even some support from Arizona’s general fund. Now, no one can count on significant near-term federal assistance, and the city can forget about help from the state: the legislature eliminated the \$22 million set aside for mass transit in the latest budget. Arizona joins only five other states in the country that do not fund mass transportation with general revenues.

Phoenix’s Valley Metro light-rail system opened in 2008. (Brian Stablyk/Photographer’s Choice/Getty Images)

SALT LAKE CITY | All Aboard

While the rapid transit ambitions in other metropolitan areas appear thwarted, Salt Lake City's relatively early vision and determination to construct a rail network still has a chance to pay off. Since building a light-rail line for the 2002 Winter Olympics, residents have embraced rail transit eagerly.

The region's modest 19-mile system will expand to more than 40 miles, opening two more routes to growing suburbs in 2011 and completing another two lines now under construction by 2015, including an airport link to downtown. The Utah Transit Authority (UTA) also is constructing a commuter-train line to Provo and is using federal stimulus money to build a downtown circulator trolley. Even during the recession, voters approved sales tax referendums to support the projects and move up completion schedules. Current daily ridership exceeds 55,000.

The local commitment extends to UTA pilot projects to help boost future ridership and spur transit-oriented development. For example, the agency is partnering with local developers to build retail/office/housing projects on UTA land around stations. Local officials seem undaunted by fiscal storm clouds: they look for savings in reduced bus service through neighborhoods served by the new light-rail lines.

Snow-capped mountains surround Salt Lake City. *(Chuck Pefley/Stone/Getty Images)*





SAN FRANCISCO | New and Old, Limited Options

The city's well-regarded Bay Area Rapid Transit (BART) Authority wants to extend its 104-mile rail network south into the Silicon Valley as well as to eastern suburbs, fulfilling long-range aspirations to branch into an expansive regional transit network. But allocating funds for constructing new tracks is running into stark budget deficits for maintaining the existing nearly 40-year-old system. The Silicon Valley Line, one of four proposed BART extensions over the next two decades, would cost \$6 billion. However, BART lacks \$7.5 billion to upgrade its current rolling stock, renovate existing tracks, and refurbish stations. Its last expansion project—a 2003 extension to San Francisco International Airport—has not met operating projections, and the lingering effects of the economic downturn has dampened overall system ridership and reduced sales tax revenues essential for supporting the transit agency. One controversial BART project that gained funding last year is a train-to-plane connector to the Oakland Airport, costing nearly \$500 million. Opponents contend the money would be better spent on BART's core system.

Separately, a 70-mile commuter-rail line through Sonoma and Marin counties could begin construction this year, eventually linking into ferry service to downtown San Francisco. The estimated \$600 million line, funded by local sales taxes, will be built along an existing railroad right-of-way with adjacent pedestrian and bicycle lanes. The line will also connect stations to bus and trolley lines, providing commuting alternatives for North Bay residents frustrated with insufferable congestion on Highway 101, the primary north-south route through the counties.

Replacement of the 75-year-old, structurally deficient southern approach to the Golden Gate Bridge is moving forward: in late 2010, state and local transportation agencies entered into a PPP availability contract for a new \$1 billion Presidio Parkway, slated for completion in 2014. The monumental \$5.5 billion replacement of the Bay Bridge east span, damaged in the 1989 earthquake and set back by construction snafus, should be finished next year.

California's well-publicized budget woes are helping stalemata any action on repairing the state's water delivery system and crumbling levees around the San Joaquin delta. Political and financial exigencies have postponed placing a bond measure on the ballot to fund a plan probably until the 2012 elections.

The Presidio Parkway project, shown in the rendering above, will replace an unsafe viaduct linking the iconic Golden Gate Bridge and the Presidio of San Francisco with a new roadway and tunnel. This project, providing enhanced pedestrian and bicycle access, will be completed in 2014. (*Presidio Parkway/Parsons Brinckerhoff Design Visualization*)

SEATTLE | Full Speed Ahead

Despite tight budgets and funding gaps, Seattle is plunging ahead with more than \$10 billion in long-planned road, tunnel, bridge, and light-rail projects to reshape and retool its transport infrastructure, further propelling the region's evolution into one of America's strategic 21st-century gateways.

Three large-scale projects are gaining momentum and collectively promise transformational change not possible in most other cash-strapped U.S. regions. After years of controversy, work has begun on a deep-bore tunnel under downtown to replace the earthquake-damaged Alaskan Way Viaduct—an



unsightly overpass cutting along the harborfront. Engineers' red flags over the safety of the nearly 60-year-old viaduct pushed the state and city to bite the bullet on the \$3.1 billion project, which should not only improve traffic patterns through downtown and along Highway 99, but also greatly enhance the city's waterfront district.

Proposed new tolls on the existing 520 Evergreen Bridge over Lake Washington to Redmond will not be enough to pay for a nearly \$5 billion, six-lane pontoon replacement, but officials seem prepared to worry later about finding funds to make up for the \$2 billion in shortfalls; the old four-lane span, the longest floating bridge in the world, can no longer handle traffic volumes and is approaching the end of its life cycle.

Buildout is continuing on stations and track for the region's Link light-rail system, which upon completion will include 53 miles of track. Construction is underway on the \$1.9 billion University light-rail line, a three-mile link between downtown and the University of Washington. A 2008 voter-approved sales tax hike

is also paving the way for a light-rail extension from Seattle to Bellevue on the east side of Lake Washington, as well as other rail lines planned over a two-decade buildout. The first line in the Link system became operational in July 2009. Local officials realize that the lack of mass transit has held Seattle back from becoming a first-rank 24-hour city.

WASHINGTON, D.C. | Incubating New Suburban Models

Virginia is moving ahead with PPP-managed toll lane projects and is considering a state infrastructure bank; the Metrorail system is building a 23-mile extension through the Virginia suburbs to Dulles International Airport; the District of Columbia is struggling with how to replace rusting pipes and antiquated sewers; and local agencies big and small are desperately searching for dollars to fund projects and repairs. So what else is new?

More than those in any other U.S. region, local communities around the nation's capital are tackling how to retrofit disconnected suburban commercial nodes as more convenient, transit-friendly centers

The 520 Evergreen Bridge—linking Seattle and Medina over Lake Washington, and the longest floating bridge in the world—faces deterioration due to high traffic volumes.

where people will want to live. In Maryland, White Flint, Shady Grove, and New Carrollton are working on rezoning plans to draw denser residential development into now car-clogged, one-dimensional retail and office districts.

But the boldest scheme, approved in 2010 by Fairfax County, Virginia, after years of preliminary study, would make over Tysons Corner, a high-profile example of car-dependent dysfunction. The Tysons transformation hinges on creating a pedestrian-oriented district around four stations planned for Metro's pending Silver line extension to Dulles Airport. Over the next two decades, stretches of black-topped parking around low-slung office buildings and regional shopping centers are to be converted into an urban street grid, accommodating high-rise office and apartment development with storefronts, restaurants, and parks. Without appreciably increasing traffic congestion, the transformation plan would double the number of jobs in office buildings to 200,000 while multiplying the number of residents by more than five times to about 100,000.

But now the hard part: Fairfax County needs \$1.5 billion for its share of road and transit improvements. Local landowners are pitching in, and local sales and property taxes must increase to help pay for the subway line. Metro, meanwhile, is cutting back service and maintenance on its existing system while trying to keep expansion plans on track as Congress threatens to curtail aid.

Tysons Corner in Fairfax County, Virginia, will be transformed into an integrated mix of residential, office, hotel, and retail uses. This rendering shows the project after the transformation. (Courtesy of CityLine Partners, LLC)







4 The Way Forward

“Infrastructure does not happen in a vacuum. It’s part of the larger debate about how we pay for things” and serves as “a microcosm” of the political schism over taxes, spending, and investing in the future. “Somehow the country must come to grips with what we need” and either accept what is possible given funding constraints or determine how to increase revenues to pay for new and updated systems. “You can’t have everything and pay for nothing.”

In the end, with constrained resources, “we need to make better choices—smart investment decisions to maximize returns and enable greater participation by private investors.”



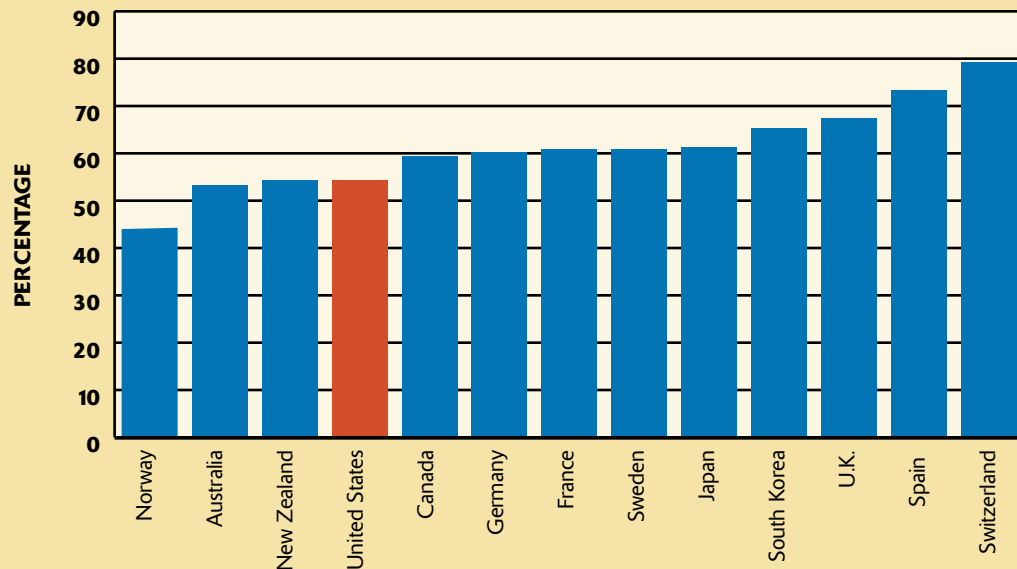
How the Process Could Unfold

The following is how the process could evolve during the next decade, given current fiscal predicaments and growing needs.

- **ENGAGING IN TRIAGE.** In the near term, the political action will concentrate on expense-reduction triage—putting off road paving projects and bridge repairs, eliminating bus routes, and nixing capital improvements or slowing down projects underway. “You just try to manage through for another year.” As federal stimulus runs dry and states hold the line on tax increases, their only choice for balancing budgets will be slashing these costs. “The economic slowdown ironically may have bought more time—reducing volume of traffic on roads. But in recovery, increasing stress on aging systems will take a greater toll.”
- **FIXING IT FIRST.** The president and Congress will ponder deficit commission recommendations for phasing in increases to the gasoline tax and allowing states to put tolls on interstates. The drumbeat will grow louder from governors, who will demand more federal funding for basic repair and maintenance. Future transportation authorizations and appropriations bills could shift funding from new projects to fix-it-first initiatives but fall far short of meeting overall needs.
- **DOWNSCALING BIG PLANS.** Fervor abates for high-speed rail. Lawmakers realize the nation needs to advance passenger and freight train corridors, but prohibitive costs and dislocation of people and businesses in major metropolitan areas present too big a hurdle under current circumstances. They could focus funding on the most viable projects with achievable economic benefits and scotch others—a responsible model for overall infrastructure expenditures. For the immediate future, the lion’s share of transportation dollars still get dispersed to states via formulas without regard to effectiveness or performance.

Americans Rank Near Bottom among Developed Countries in Satisfaction with Public Transportation

Percentage Satisfied with Public Transportation in Their Area

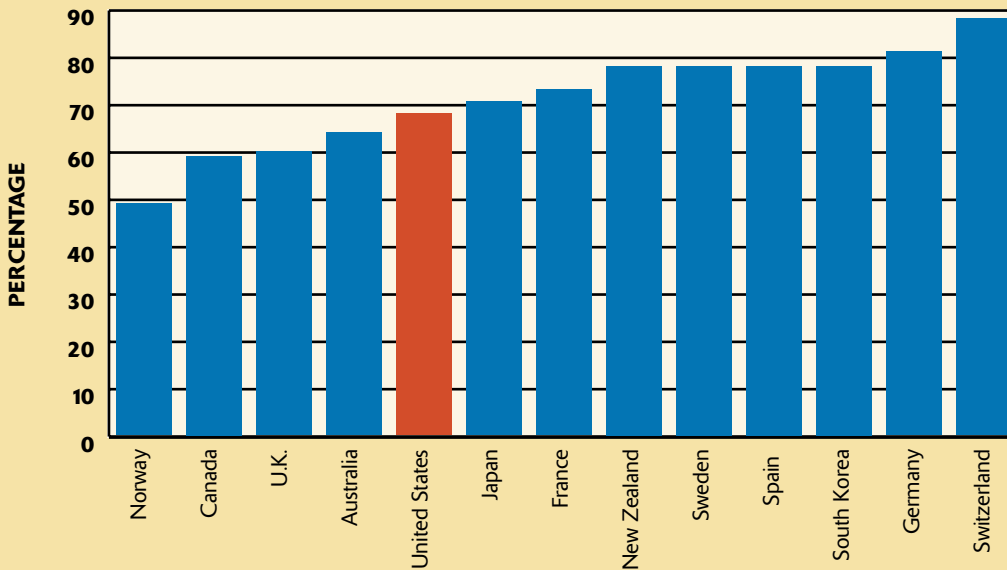


Source: Gallup World View, 2009 data, Organization for Economic Cooperation and Development (OECD) countries.

Note: Figures represent percentage responding “satisfied” to the following question: In the city or area in which you live, are you satisfied or dissatisfied with the public transportation system?

Roads and Highways Fare Better, but Americans Are Still Relatively Dissatisfied

Percentage Satisfied with Roads or Highways in Their Area



Source: Gallup World View, 2009 data, Organization for Economic Cooperation and Development (OECD) countries.
 Note: Figures represent percentage responding "satisfied" to the following question: In the city or area in which you live, are you satisfied or dissatisfied with the roads and highways?

- **EVENTUALLY PAYING MORE.** Taxes may not increase immediately, but users will start to face higher costs over time. Pressure will build to raise transit fares and tolls to meet operating budgets, and Congress likely will loosen restrictions on tolling in future transportation bills. More cities and towns will enact increases on water bills so they can maintain water lines and sewers. Parking rates and traffic fines will escalate to help pay for necessary repairs and upgrades.
- **MAKING TOUGH CHOICES.** Ultimately, more local governments will raise property and sales taxes or establish special tax districts to fund essential capital needs. In the alternative, some systems will be left to deteriorate: more municipalities may follow Detroit's example and abandon services in certain districts. In lightly traveled rural areas, transportation departments may let some blacktopped roads go back to nature.
- **SEEKING PRIVATE SOLUTIONS.** States and cities, desperate for new sources of capital to fund infrastructure needs, will reach out to private funders and operators for solutions both for constructing new systems and managing existing networks. The handful of recent public/private partnership deals will offer lessons learned for crafting workable structures and procurement policies. Private operators will begin to introduce greater efficiencies and more realistic life-cycle budgeting to help manage ongoing costs, "connecting the need for services to revenues and funding sources [taxes, user fees] to pay for those services."
- **WITNESSING A DECLINE IN INFRASTRUCTURE.** Over the next five to ten years, public concerns will grow over evident declines in the condition of infrastructure. "We've approached the point where systems will deteriorate more quickly and increasingly affect mobility." Wear and tear has been "too gradual for people to notice," but inevitable service interruptions will heighten awareness and calls for action. Business groups will lobby for more attention to and funding for infrastructure once it becomes irrefutable that commercial productivity and national competitiveness have been affected.

■ **TURNING INFRASTRUCTURE INTO A PRIORITY.** At some attention-getting point after infrastructure limps along, platforms for reinvesting in America could gain significant traction and public support. So far, politicians have been unable to create a vision for reenergizing the economy through necessary infrastructure reinvention and innovation that integrates transportation, energy, and industrial policy, as well as land use. “Failure may have to happen,” says an interviewee. “It’s a sad commentary.”

Strategies and Solutions

Shrunk resources and huge budget holes have not changed an unsettling reality: the United States still lacks a national strategy for mending its existing infrastructure and building the new networks needed to support future economic growth. Officials and planners working with less money and confronting more problems have more incentive than ever to direct policy onto a sensible course. They may find a palatable middle ground between a China-like spending spree and more of the same.

The opportunity exists at every government level—federal, state, and local—to establish rational priorities, attract new capital, and achieve efficiencies, giving the public what it ultimately demands, full value for every tax dollar.

“Addressing the need for capital means widening the combinations from all possible sources,” including an array of income, sales, and property taxes; public/private partnership structures; user fees; bond issues; and infrastructure banks. Despite looming reductions, the federal government will remain the largest capital provider for essential infrastructure: “Nothing can get done without federal infusions.” But states and local governments need to take more responsibility for raising necessary funds, including engaging private investors and operators in order to develop new approaches for infrastructure finance. “That’s the realpolitik: the states are now forced to deal with it.” And one way or another, the public will dig deeper into its pockets or drive into bigger potholes.



The following is the consensus view of the report's interviewees for what can get done under difficult circumstances and what they consider a roadmap for progress.

■ **MAKE BASIC REPAIRS AND MAINTENANCE A PRIORITY.** Big-ticket capital projects make splashy headlines, but states and cities need to concentrate limited resources on humdrum, nuts-and-bolts initiatives that can prevent existing systems from falling apart. States and metropolitan regions need to set priorities for what to address based on safety, economic cost and benefits, and changing market demands. This approach will help them avoid much larger bills for emergency repairs or wholesale replacements and will reduce the chances of economic dislocation from service interruptions or system breakdowns.

■ **DEVELOP A NATIONAL STRATEGY.** What's the hang-up, America? Every other major country has an infrastructure plan—tied to long-term national economic priorities. A Congress promising thrift and frugality might consider ditching embedded practices that appropriate funds and grants willy-nilly for disconnected projects bubbled up from state and local agencies, often with disparate agendas.

Instead, executive branch departments working with lawmakers could identify essential infrastructure networks with clear payoffs for economic growth, then ask states and local governments to develop long-range plans to link into them. If the United States wants to regain its export capacity and handle expanding import traffic, funding needs to be concentrated in the nation's primary commercial gateways linked to global pathways. In turn, gateways need to connect efficiently to surrounding business and industrial centers.

■ **USE A RACE TO THE TOP MODEL.** The United States will not scuttle its federal system for leaving most infrastructure development and land use decision making in the hands of state and local governments. But federal funding prerequisites should change to encourage regional planners to develop multidisciplinary strategies for tying into national infrastructure networks, thereby gaining efficiencies. They should shift funding to competitive grants for programs that integrate:

- economic development to enhance jobs growth and productivity;
- multimodal transportation networks (road, rail, mass transit, airport, and pedestrian) to improve mobility, reduce energy consumption, and decrease pollution;
- land use concepts, neighborhood planning, and provisions for water/wastewater systems to ensure that growing populations can sustain a high quality of life; and
- transmission corridors to tap into new power grids.

Patterned after the Race to the Top model used for education funding, states could win federal infrastructure disbursements based on more merit-based criteria related to developing these integrated plans, with rewards for creating more jobs, enhancing mobility, and encouraging sustainable lifestyles. "Inefficient planning and disconnectedness increase the cost of capital," explains an interviewee. "We need to adopt a more cohesive, holistic approach to allocating federal funding," especially if there will be less money to go around.

■ **SHORE UP THE GATEWAYS; INTEGRATE LAND USE.** Obtaining the biggest bang for the taxpayer buck requires bolstering the nation's large metropolitan areas, where businesses and population concentrate, starting with the primary global gateway cities along the coasts and the major interior international airport hubs. People and commerce must flow efficiently into and out of these important centers to enable surrounding regional growth and to buttress the overall economy. Regional planning should stretch across state and city boundaries to integrate land use and infrastructure improvements, encourage compact development around suburban nodes and transit stations, and anticipate the future housing and service demands of expanding populations. In today's global economy, if the nation's gateways falter, the entire country suffers.

■ **PROVIDE GREATER FEDERAL FUNDING CERTAINTY.** Congress could help lubricate the public/private partnership process for infrastructure development by allocating funding in a way that ensures support over extended project time horizons. “It’s difficult to attract private money into U.S. transportation infrastructure without long-term certainty of funding”; the annual appropriations mentality of Congress and shortfalls in the Highway Trust Fund do not inspire confidence. “Many prospective bidders don’t want to take the chance dollars will run out in later years. They don’t want to be left high and dry.” In Europe and Asia, infrastructure projects are typically viewed as 30- to 40-year investments.

■ **EXPAND FUNDING SOURCES.** States and metropolitan areas must wean themselves off dependence on problematic federal funding lifelines and create more diverse revenue streams to help pay for infrastructure. “They are learning they can’t depend on Washington.”

That means relying more on local sales taxes, user fees, and private capital for local infrastructure investment and management. Various alternatives include combinations of leasing more concessions and forming development consortiums with private operators and investors, raising gasoline taxes and water rates, instituting congestion pricing scenarios and user-toll plans like HOT lanes, and linking bond issues to tolls and new fees. “Fifty different funding models may be incubated, all of which won’t work or be politically popular,” says an interviewee. “But states and regions that figure it out will have better prospects than others, and the models that work can be emulated.”

Architect Santiago Calatrava and New York City officials unveil the design of the World Trade Center Transportation Hub at the World Trade Center site. (Stephene Chernin/Getty Images News)



■ **STANDARDIZE PPP PROCESSES AND PRACTICES.** Early public/private partnership activity has met with mixed success. Political haggling and uncertainty discourage private operators from bidding on concessions, while some concessionaires have underperformed. Partnerships have struggled to apportion risks and rewards, and the public worries about “getting fleeced.” But a handful of states, including Virginia, Florida, and Texas, have had success in fashioning procurement practices and refining relationships with private operators that want a level of predictability in reaching agreements.

“If experienced states can band together to help develop standard best practices, they can help lead the way for others to institute PPP solutions.” The federal government could help by establishing an office to research and disseminate PPP best practices, investigate international PPP approaches, and keep a list of U.S. projects seeking private funding.

■ **INSTITUTE INFRASTRUCTURE BANKS.** At a time when funding is scarce, establishing a U.S. infrastructure bank seems like a no-brainer to help finance major projects, especially across state lines. The concept also appears tailor-made to help states maximize their more limited resources and nurture public/private partnerships. Long-term infrastructure bank financing can help governments secure additional private loans for project consortiums and enable lower-cost bond issues. “It’s a way to develop and attract new revenue streams and leverage federal funds with private investments and state funds in a strategic process.” State infrastructure banks, like California’s, also show promise.

■ **PHASE IN USER FEES.** Once the fiscal climate and jobs outlook improves, governments at all levels need to lay the political groundwork for imposing indexed user fees to fund infrastructure improvements. Raising and indexing the gasoline tax is an obvious target, but water districts and power authorities also require capital to address aging and neglected mains, sewers, waste treatment plants, and transmission lines. Understandably, the public will resist user charges, but a slow, phased-in process can make the expenses more tolerable and acceptable. Indexing user fees to inflation and GDP growth would help Congress avoid annual legislative conflict over raising rates and funding shortfalls.

■ **DRIVE DOWN COSTS.** In addition to enhancing revenue streams, states “need to figure out mechanisms to reduce costs and find better operating efficiencies. For starters, officials should adopt “full life-cycle costing” policies that not only budget for constructing infrastructure assets, but also plan ahead for proper maintenance and eventual replacement, building in appropriate operating and capital reserves. “Costs mount later if you don’t properly fund operations and maintenance. That’s what many states are finding out today since they haven’t been doing it.”

■ **LEVERAGE EMERGENCIES.** It is unfortunate that the current system often responds to crisis and tragedies: that is when local governments gain sympathy, attract funding, and institute change. Congress typically springs into action with emergency appropriations, and often-delayed projects can move ahead. San Francisco removed its eyesore Embarcadero elevated highway after the 1989 earthquake, levees in New Orleans were finally repaired following Hurricane Katrina, and New York City is developing a downtown mass transit hub as part of its rebuilding of the World Trade Center site. When local governments have well-considered regional plans in place to revamp systems, they can transform disasters into support for game-changing improvements.



EAST COAST PORT UPGRADES

Dredging Is Not Enough

Because 95 percent of U.S. international trade moves in and out of the country by ship, the federal government should have a national strategy to manage ports, as well as the road and rail freight-hauling networks serving them. Three separate federal agencies—the Maritime Administration, the Army Corps of Engineers, and the Coast Guard—are involved in port oversight, but no government entity is responsible for ensuring that the country's ports work in concert to maximize distribution and enhance import/export capacity. Congress, meanwhile, tends to allocate money to port projects on an ad hoc basis without necessarily looking at the big picture or at the needs of the overall U.S. freight movement system. And ports can self-fund a large chunk of their improvements with shipper fees.

In summer 2014, the Panama Canal is scheduled to complete a \$6 billion expansion and widening that will enable larger container ships traveling from the Pacific Rim to gain access to U.S. harbors along the Gulf and Atlantic coasts more directly. Shippers will be able to bypass sometimes-gridlocked West Coast ports—including Los Angeles/Long Beach, San Francisco,

The Panama Canal expansion project will double the canal's throughput by allowing more and larger ships to pass.

and Seattle—and avoid cross-country freight distribution for many deliveries.

Not surprisingly, cities along the Eastern Seaboard see dollar signs from the potential augmented port activity. But in order to take advantage of the opportunity, they will need not just deeper ports, but also the regional networks and freight connections to get the goods to market.

Optimally, officials would make dredging plans in the context of overall port/road/rail connectivity needs in order to ensure adequate speed of goods transport. The multistakeholder, cross-sector nature of the high-stakes race for post-Panamax freight in the Southeast highlights the need for better coordination among port, rail, and road investments, and the drawbacks of the lack of a national port policy.

The High Costs of a Piece of the Post-Panamax Pie

Norfolk, Virginia; Charleston, South Carolina; Savannah, Georgia; and Jacksonville and Miami, Florida, are all vying for a piece of the action, which could generate thousands of new jobs. But only Norfolk has a 50-foot-deep harbor that can accommodate the massive “post-Panamax” ships, which haul almost three times the number of containers as current vessels.

Now governors, senators, and congressmen from South Carolina, Georgia, and Florida are making the case for direct federal grants for harbor dredging for their favored ports. The requests, which could add up to billions of federal dollars, include the following:

- Savannah needs \$600 million for its multiyear harbor-widening project, in addition to the \$40 million the U.S. Army Corps of Engineers has already allocated for a feasibility study.
- Charleston’s dredging will cost an estimated \$300 million, including an immediate \$400,000 earmark to launch its feasibility process.
- Widening the St. John’s River channel into Jacksonville could cost \$500 million or more.
- Miami requires \$180 million for its dredging, a “nominal price” compared with its competitors, claims a local newspaper editorial in support of a federal grant.

In addition to the hefty price tags for dredging, the Southeast ports have encountered significant obstacles in their channel expansion plans, including extensive shoals requiring expensive ocean entrances, narrow rivers, hard river bottoms too expensive to dredge, and prospective environmental damage.

Meanwhile, up north at the East Coast’s biggest port, New York–New Jersey, the Port Authority is considering a \$1.3 billion project to raise the Bayonne Bridge so the new, bigger boats can pass under the span.

Ports Require Rail and Road Connections

None of these budget numbers, though, includes all-in, necessary improvements to terminals and other facilities, not to mention expanded roads and rail lines to move increased container volumes in and out of the dockyards. Houston, for example, conservatively anticipates \$2 billion in projects over the next decade for everything from cranes and terminals to dredging so its port can manage Pacific traffic.

What is clear is that it might not be necessary or economically feasible to dredge all these harbors to meet Panamax standards—at least initially. And ports do not need just deep channels. They also need facilities and ground infrastructure suitable for moving shipments strategically and efficiently outside their regions, with ties to existing national networks. At many ports, these networks have not been upgraded for years. The costs of building new freight rail links and expanding highways are considerable, and maintenance costs will be, too: increased truck traffic adds significantly to roadbed wear and tear, as well as congestion.

A stove-piped approach to funding dredging misses the need to plan for these large, cross-sector investments.







5 Investment Discipline

At the heart of the U.S. infrastructure dilemma is government struggling to allocate increasingly limited resources to attack accumulating problems. “The first thing you must realize is that you can’t do everything, let alone everything at once.” That is why long-term planning and setting merit-based priorities will be so important: today there is just less margin for waste. Instead of adhering to a spending mentality—apportioning the money pie until nothing remains—government must adopt an investment mindset, putting revenues to work based on securing the biggest overall return for taxpayers.

Making such value-for-money decisions will prove politically contentious, resulting in winners and losers, but the country loses when money gets spread around to all corners or earmarked indiscriminately. Decisions should prioritize public safety, economic productivity, and future competitiveness. Here are some sound approaches:

- States should concentrate essential road and other infrastructure repairs in commercial hubs and larger residential centers, reluctantly rationing support to outlying districts and economically less important regions.
- Ports along the East and Gulf coasts are clamoring for federal funding to build facilities and dredge harbors to accommodate hulking post-Panamax ships coming from Asia through a widened Panama Canal. Available monies should be allocated to the most strategic locations with the most efficient links to freight-hauling networks, facilitating the nation’s import/export strategies.
- A generation ago the federal government could afford to build interstate highways through all 50 states, including thousands of miles of lightly traveled rural expanses. But today, many regions and states cannot make a sound case for high-speed rail.

The limited available dollars should go where the new lines will move the most travelers, relieve the greatest congestion, and operate most economically.

- Funding for new airports and airport expansions should be tied to formulas for alleviating delays along the nation's most heavily traveled flight paths and relieving bottlenecks at primary gateway hubs.

Public/Private Partnerships: New Momentum after Early Misfires

International observers wonder how the United States, "the leading capitalistic economy in the world," so badly trails "so-called socialist countries" like France and Spain in "attracting private capital for their infrastructure projects." Even "communist China" has helped bankroll its hundreds of billions of dollars of ongoing infrastructure improvements through innovative stock exchange-traded companies that manage projects paid for with future concessions. Recent institutional investor surveys indicate that the majority of capital for infrastructure funds comes from U.S. sources, but, ironically, a dearth of viable U.S. projects leads managers to allocate most capital to Europe, Asia, and Latin America.

Indeed public/private partnerships have taken a bumpy road in their recent U.S. rollout. Oversold before the economic crash as a solution to get new transport projects built and improve performance of existing systems, the relative handful of pioneering U.S. transactions quickly raised doubts, while some just flopped. State and local governments had trouble valuing concessions, some investors overleveraged their positions, contracts allocated risks poorly, and political storms erupted over higher costs to users and taxpayers. Then the worldwide financial meltdown cratered an inflated market. Today, more conservative investor temperaments and reduced credit availability diminish market appetites and infrastructure values.

But the missteps and failures offer a perspective for redirecting the process and formulating better (if not moving toward best) practices and approaches. "Now the level of interest has increased markedly as public sources of funding dry up," says an interviewee. "People realize PPPs will not be *the* solution, but can be *part* of the solution and an important tool" for building and managing certain types of projects and concessions.

Six Keys to Successful Public/Private Partnerships

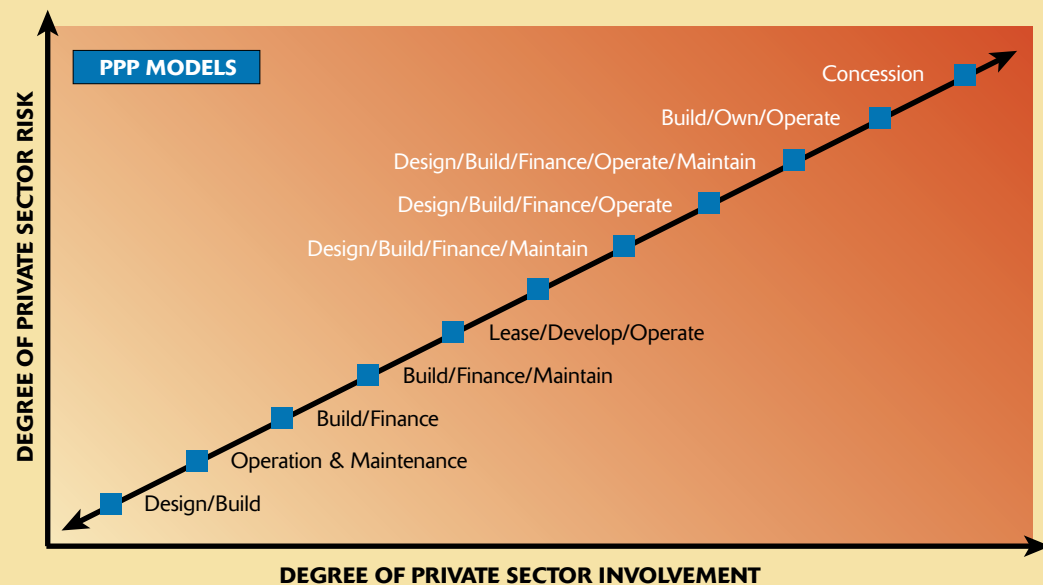
- 1 A conducive statutory and political environment.
- 2 An adequately organized public sector structure.
- 3 A detailed business plan and contract.
- 4 A guaranteed revenue stream.
- 5 Strong stakeholder support.
- 6 Careful consideration of partners.

Source: Adapted from the National Council for Public-Private Partnerships.

PPP Project Outlook

Infrastructure players expect sporadic and limited PPP activity to pick up in the transportation arena as financial markets continue their recovery from the credit crisis. "Two years ago, I was biting my nails over whether we could do anymore projects," says an operator, "but now it looks like a complete reversal in the U.S. There should be no shortage of deals."

PPP Models Vary According to Degree of Private Sector Involvement and Risk Transfer



Source: Ernst & Young LLP.

Among the PPP projects in the works are the following.

- **GREENFIELD PROJECTS.** Nearly a dozen greenfield projects are under way or have been completed, and an interviewee suggests another ten to 20 could be started over the next five years. "Positive [partnership] transactions are beginning to offset some of the early setbacks." PPP projects that have recently closed or are in advanced planning stages include:
 - In San Francisco, the Presidio Parkway is being extended from the Golden Gate Bridge by a private consortium in a \$1 billion deal that will reach financial close in 2011.
 - In Denver, the FasTracks extension to the airport attracted private funding of \$2.3 billion in 2010.
 - In Florida, a \$900 million deal to connect I-395 to the Port of Miami Tunnel was closed in 2009, as was a \$1.8 billion deal to build the I-595 extension. These are the first transportation PPP projects in the United States to use availability payments.
 - In the Dallas–Fort Worth Metroplex, the Lyndon B. Johnson Freeway will receive 13 miles of managed toll lanes in a PPP deal worth \$4.7 billion that closed in 2010. And in a deal that closed in 2010, the North Tarrant Expressway will receive a variety of upgrades, including 13 miles of managed toll lanes, at a cost of \$2.5 billion.
 - Virginia is working with a consortium to build HOT lanes along the Capital Beltway in suburban Washington, D.C., in a deal worth \$1.4 billion, and has other projects in the bidding stage.
 - In Indianapolis, a public parking concession is netting the city government \$20 million upfront, with potential revenues of \$600 million to be shared over the life of the 50-year lease, which began in 2010.
 - In suburban Atlanta, the state department of transportation is putting together a plan to build 30 miles of managed toll lanes using PPPs. The West by Northwest HOT lane project, which is still in the works, will cost \$2.3 billion to construct.

HOT and managed toll lanes added to existing free roads are managing to overcome political opposition to user fees because adjacent free lanes remain available to drivers. Officials also can make a case for building new toll roads and fare-based mass transit, but charging for in-place free systems presents a more difficult political challenge.

- **EXISTING ASSETS.** Distressed cities and states are hungrily assessing the possibility of transforming existing brownfield transportation assets, including parking garages and roads, into private concessions to raise money for general services or pensions.

Whereas Indianapolis closed its 50-year deal privatizing parking meters and garages, a similar parking deal failed in Pittsburgh, where the mayor had hoped to use the proceeds to fund city pensions; similar plans have also failed in other cities. Since the Chicago Skyway and Indiana Toll Road were privatized in 2005 and 2006, respectively, many state leaders have hit a wall of public outrage in attempts to sell concessions on the nation's handful of existing toll roads, most of which are located in the Northeast. Fears of sharply higher tolls are fueling distrust and concerns are welling up over irresponsible politicians selling valuable assets on the cheap to get out of current fiscal binds.

Given political antipathy toward tolls and user fees, states are showing little inclination to approach the federal government for permission to place tolls on the country's more than 40,000 miles of free interstates, including many primary arteries leading into major gateway cities. When they do, they can hit legal and bureaucratic roadblocks. Pennsylvania's proposal to place a toll on I-80 was turned down last year by the U.S. Department of Transportation's Federal Highway Administration because the governor wanted to use the revenue to repair other state roadways. Despite the state's quandary over how to fund essential fix-it projects, the Federal Highway Administration ruled that the request would violate laws passed in the mid-1950s at the start of nation's interstate building boom.

Indianapolis received an upfront payment of \$20 million from ParkIndy LLC for its parking meter concession. ParkIndy will modernize the city's aging parking meters, shown below. (AP)





■ **WATER/WASTEWATER PROJECTS.** As replacement and major repairs become a priority for the nation's rapidly aging wastewater treatment and water delivery systems, local governments can be expected to gravitate toward PPP solutions, which can prove particularly "conducive" to partnership arrangements. Not only is user demand highly predictable and measurable through metering, but also rate-paying systems exist. "It's not like new road projects, where it's hard to predict traffic volumes and tolling revenues." In turn, investors can count on solid returns with much lower risk than transportation development, "and they avoid the political uncertainty."

In California, Rialto city officials are moving forward with a water PPP. In Canada, British Columbia and Ontario actively encourage municipal governments to consider wastewater/water system PPPs; the provinces provide expertise and subsidies for cities to evaluate and structure proposals, which would use life-cycle analysis and risk-sharing approaches to minimize costs. An internal advisory panel has recommended that the U.S. Environmental Protection Agency consider a similar approach to prod states and municipalities into PPP arrangements.

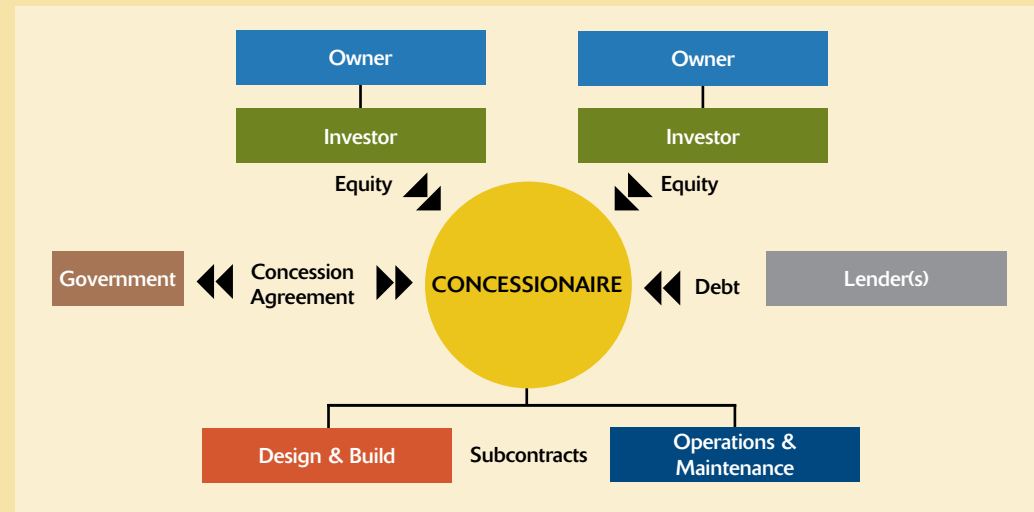
Public/Private Partnerships: Lessons Learned

The following are some of the obvious and less-obvious lessons learned so far in the PPP school of hard knocks.

- **PPPS DO NOT SHIFT PAYMENT BURDENS.** "They are a way to finance projects less expensively and can reduce operating costs." But ultimately the revenues for building and operating infrastructure flow from users and/or taxpayers. "There's no free lunch."
- **PPPS DO NOT SUBSTITUTE FOR SOUND POLICY.** Well-crafted arms-length partnership agreements can help make individual projects feasible. But infrastructure policy and oversight remain a government function and responsibility while profits and investment returns motivate private operators. In particular, the government must ensure the overall health and efficiency of multimodal infrastructure networks and cannot protect or favor a concession monopoly at the expense of the entire system.
- **GOVERNMENT SHOULD PORTFOLIO-MANAGE TRANSPORTATION FRANCHISES.** Instead of operating them as separate turnkey operations, the government should manage concessions and projects in "a portfolio approach," integrating them as part of an overall plan for funding infrastructure needs, meeting mobility objectives, and reducing environmental impacts, including pollution and carbon footprints.

Many Parties Are Involved in Public/Private Partnership Deals

PPP Transaction Diagram



Source: Ernst & Young LLP.

- **“NOT ALL INFRASTRUCTURE IS A CASH COW.”** This government portfolio model applies especially to managing revenues and funding maintenance of overall systems. A PPP may be “a terrific device” for building a new toll road, but it has been proved “less suitable for rehabilitation and system repair,” where the vast majority of funding needs exists. Not surprisingly, private operators generally target “monopoly” concessions, including busy highways, center city parking garages, or new projects with strong potential to attract high user volumes. They shy away from less-profitable franchises. If the PPP is properly structured, proceeds from revenue-producing concessions can be applied to maintain feeder systems, as well as to provide subsidies for less-profitable but necessary networks that support commercial activity, such as mass transit.
- **INFRASTRUCTURE PROCEEDS SHOULD FUND INFRASTRUCTURE NEEDS.** Monetizing existing infrastructure assets in big lump-sum concession payments may bail out temporarily desperate governors and mayors looking to balance budgets (the Chicago Skyway), or to fund broken pension systems (the impetus behind Pittsburgh’s failed parking initiative). These transactions also may adequately cover future operations and maintenance of specific concessions. But deals with alluring short-term benefits can effectively “strip funds from the infrastructure asset class.” Unless proceeds “get ring-fenced in an infrastructure trust fund” (Indiana Toll Road), these PPP deals will fail to address festering long-term, systemwide problems and can dig the infrastructure deficit hole even deeper for future generations of taxpayers.
- **THE PPP BIDDING PROCESS NEEDS GREATER RELIABILITY.** States and cities collectively shoot themselves in the foot when they request proposals for partnership bids and then change parameters in midstream or upend the process for political whims. “PPP jurisdictions which don’t have a clear process, with relative certainty and predictability, will not attract good bidders or gain a good result,” says a private player. “Top operators don’t want to waste their time or money.” Agencies in Massachusetts, Pennsylvania, Texas, and Pittsburgh, are among the government entities that “pulled the rug out” from under concession bidders following lengthy and expensive courting exercises. States have slowly come to realize that they need to develop standards and start to institute more

uniform approaches across jurisdictions. “Virginia has been a leader in creating model legislation for conforming partnership policies and procedures”; Florida and Georgia also win some plaudits. Industry groups have been formed to work with state officials on developing common best practices. “The more clarity and consistency about policies and programs, the better,” says an interviewee, adding “some form of national guidelines would be best.”

- **RISKS MUST BE SHARED APPROPRIATELY.** New PPP infrastructure development is beginning to steer away from lump-sum transactions and become more sophisticated in sharing rewards and risks, placing appropriate responsibilities on the party better positioned to manage potential downsides. Under these newer transactions:
 - Government handles “public realm issues” to reduce uncertainty about whether the project can proceed. These include rights-of-way, environmental clearance, historic preservation, and urban design plans. If the project cannot go forward because of political hang-ups, the private partner is protected. With political and regulatory surprises eliminated and the project scope defined, bidders can focus on pricing hard costs of design, construction, and operations. “That reduces the chances for nasty cost overruns.”
 - Both sides determine an availability payment structure, in which the government fronts early development costs and the private partners’ ultimate returns are linked to satisfactory delivery and operation of the project. They must analyze total project costs on a net-present-value basis, taking into consideration operations, maintenance, and capital expenditures over the entire life cycle of the concession. Availability payments also lower financing costs by reducing the chances of developer default and project risk.
 - The private operator carries the entire responsibility for delivering the project to completion on time and on budget. “The government requires surety bonds to be made whole in case of default so the developer can’t get off the hook.”
 - The government takes responsibility for police, fire, and security.
- **LIFE-CYCLE ANALYSIS IS A BEST PRACTICE.** Requiring contractors to bid based on infrastructure life-cycle costs probably provides the most significant evolving value add through the PPP budgeting process and promises the greatest efficiencies. Too often government planners have disconnected budgets for designing, building, and operating projects. “To get a handle on actual budget, you need to understand the total cost of any project from beginning to end, including maintenance and future capital expenditures,” says a PPP consultant. “An impractical design may not cost out when you put it out to bid for build. You also need to analyze the value of money invested. It may make sense to speed up delivery of a project to avoid higher costs later on for material and construction.” When done correctly, life-cycle planning also anticipates proper maintenance, which can limit disruptions, reduce emergency expenditures, extend project life, and decrease future capital requirements. “It’s not rocket science.” For example, when Missouri recently structured bridge replacement and road repaving contracts to also cover long-term maintenance, contractors were incentivized to use higher-grade asphalt, which holds up better for longer. “The built-in savings on future maintenance allowed the state to repair more bridges.”

Prospects for Increased Institutional Funding

Gauging institutional interest in infrastructure investments is imprecise at best. A recent survey by Institutional Real Estate Inc. points to modest but growing activity. The survey estimates that in 2010 about \$34 billion was invested worldwide in infrastructure concessions and projects—a drop in the bucket compared with the massive estimated worldwide need in the trillions of dollars. At least 200, and possibly as many as 300, institutions have made allocations to infrastructure funds and assets, according to the survey. Those investors include trend-setting sovereign wealth funds and influential plan sponsors like the California Public Employees' Retirement System (CalPERS). One to 2 percent of surveyed funds' total assets are invested in infrastructure currently, "but allocations could increase to 5 to 10 percent over the next 15 to 20 years." Because most institutional investors lack in-house expertise, they prefer to invest through private equity managers in multiple assets, gaining diversification among project types and locations.

The vast majority of Institutional Real Estate survey respondents view infrastructure as a global, rather than U.S.-only, investment, and anecdotal evidence from investment managers indicates that the majority of their investments occur outside the United States because of the unsettled deal-making landscape. In addition, institutions are choosing investments in privately owned energy/utility projects over public/private partnerships, remaining hesitant while governments work out their procurement kinks on transportation development. That is another reason why "institutional investors are definitely holding back on U.S. PPPs, waiting for the market to mature and for best practices to get established."

For now, "Canada, Australia, and Europe are far ahead in accessing institutional capital," says an interviewee. "But from a budgetary standpoint, the U.S. needs more private capital. It's just a matter of time before America catches up."

A Final Thought: Carpe Diem

For a nation that prides itself on innovation, enterprise, and leadership, the United States lacks government and corporate initiative in the infrastructure arena, presenting either a stunning paradox or stark evidence of its waning economic clout. Is it just a matter of time before political priorities reorient and stoke competitive fires to bolster essential systems for growth and productivity? Or has the dispiriting recession dealt a staggering financial and emotional blow, severely constraining options for overcoming increasingly obvious systemic decline?

Although the country may temporarily have entered an uncomfortable "era of less" (dominance, growth, wealth creation), prodigious levels of lingering prosperity from boom times can be redirected into meeting infrastructure imperatives with the potential for significant payoffs supporting future generations. The country—government, business, and citizens—has tackled monumental infrastructure undertakings before, building revolutionary canal and railway systems, as well as the interstate highways.

Politicians need to better explain to their constituents how redirected priorities for greater infrastructure investment could result in more jobs and greater business opportunity. And more business leaders, investment bankers, and others need to apply some of their knowledge, experience, and innovation in helping rebuild the country.

In the Land of Opportunity, opportunity certainly presents itself.

Report Notes

CURRENCY

All currency is in U.S. dollars, unless otherwise noted. Foreign currencies were converted into U.S. dollars in February 2011.

QUOTES

ULI conducted 20 interviews with industry experts for this report. All unattributed quotes are from these interviews.

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Mackinac Bridge, the largest suspension bridge in the Western Hemisphere, connects Michigan's Upper and Lower peninsulas.





Infrastructure 2011: A Strategic Priority assesses the state of infrastructure in the United States and around the world, examines what the next few years are likely to hold, and provides recommendations for moving forward on the infrastructure investments and strategies that are needed for regions and countries to continue to prosper and grow.

Based on interviews with industry experts and research, *Infrastructure 2011* identifies national infrastructure strategies in a variety of countries, noting that most have put in place serious efforts to identify and address infrastructure deficiencies and chart a course toward lower energy and oil consumption. It contrasts these approaches with those of the United States, which still lacks a coherent national strategy and struggles to give infrastructure the priority it deserves.

Infrastructure 2011 shines the spotlight on U.S. metropolitan areas, reviewing infrastructure and transportation efforts and illustrating how resourceful U.S. regions can move forward on projects to enhance freight and passenger rail links, roads, and bridges—even in the face of serious fiscal hurdles—by combining various sources of funding, working across regional boundaries, and using public/private partnerships.

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