

Infrastructure 2010

INVESTMENT IMPERATIVE

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Infrastructure 2010

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Cover: The Chicago River reflects Chicago buildings. Under Mayor Richard M. Daley, Jr., the city launched a major effort to clean up the once-polluted Chicago River.



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Infrastructure 2010: Investment Imperative

Infrastructure 2010: Investment Imperative has a simple thesis: We must start treating infrastructure like an investment. Too often we treat it as anything but, funneling spending through siloed formulas and sidestepping critical questions about the country's longer-term infrastructure strategy and vision. The nation's vast infrastructure needs offer an opportunity to create much-needed jobs while making the lasting, integrated infrastructure investments that will lay the foundation for future prosperity.

The 2010 infrastructure report—the fourth in an annual series produced by the Urban Land Institute and Ernst & Young—examines global infrastructure trends and, for the first time, addresses water issues in depth. Water is the hidden infrastructure conundrum, with aging pipes and inadequate systems running headlong into rapid population growth in America's most water-constrained regions. *Infrastructure 2010* probes water challenges in the United States and abroad, including the overlapping challenges of aging pipes, failure to conserve, contamination threats, and the difficult issue of effective water management. Building on extensive research, interviews, and data collection, *Infrastructure 2010* reviews the specific water issues and concerns confronting 14 metropolitan areas throughout the country.

Across the nation, there are signs of a renewed commitment to infrastructure. Innovative state and local govern-

ments are taking the initiative on building and funding new and often costly infrastructure projects, including transit and rail. And more and more Congressional and administration leaders recognize the importance of infrastructure to national competitiveness, even if they can't agree on priorities or how to fund it. At the federal level, creative partnerships between agencies—including the sustainability partnership between USDOT, HUD, and the EPA—are linking and coordinating environmental, transportation, and land use programs. Federal agencies are experimenting with new grant programs that award dollars in more merit-based, competitive ways, and revising old grant criteria to be more holistic and wide ranging. These are promising moves, but more needs to be done.

As in previous editions, *Infrastructure 2010* provides a glimpse of global infrastructure initiatives in 16 major international markets, highlighting China's continued strong investments in rail and water infrastructure. This year's report also reviews water conservation efforts in Australia.

An investment in infrastructure is a promise to future generations. Done well and strategically, it can help guarantee increasing prosperity and rising standards of living. Countries around the world—in particular, China, but also those in Europe and elsewhere in Asia—recognize the infrastructure investment imperative. America must now do the same.

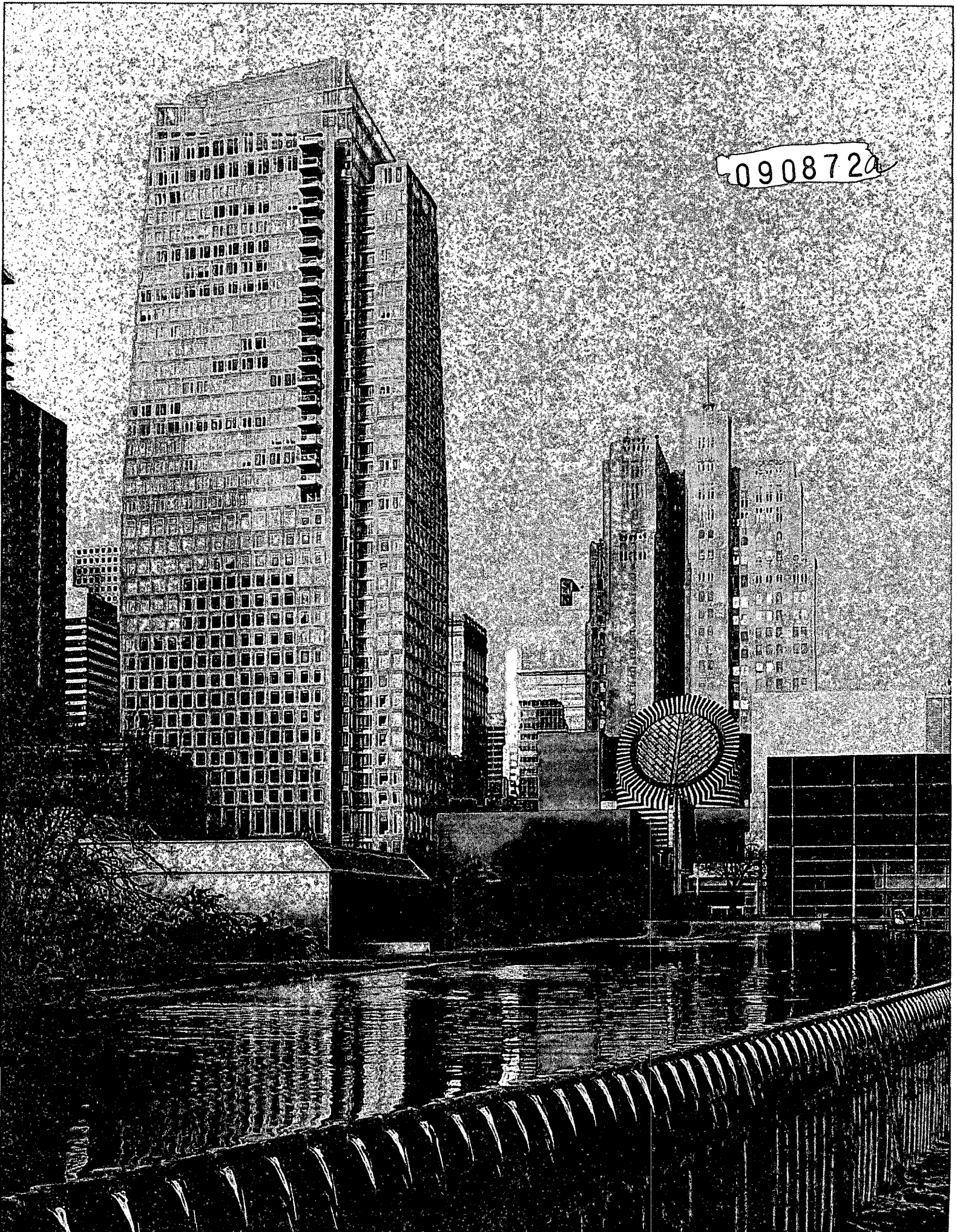


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Executive Summary

Falling behind global competitors, the United States struggles to gain traction in planning and building the critical infrastructure investments that are necessary to ensure future economic growth and support a rapidly expanding population.

Recent federal stimulus spending addresses some pressing repair needs for transport- and water-related systems and provides seed funding for high-speed rail in important travel corridors, as well as new energy infrastructure. But recession-busted government budgets, entitlement and defense expenditures, and ballooning health care costs push infrastructure down most political priority lists—leaders continue to procrastinate when it comes to new investments as stressed taxpayers balk at more spending.

A Path Forward

Infrastructure 2010: Investment Imperative warns that further delay risks impeding sustained economic recovery and means losing additional ground to countries in Asia and the European Union. These nations continue to implement long-range programs to integrate rail, road, transit, airport, and seaport networks to serve major economic hubs, employing state-of-the-art technologies and systems. Despite coping with recessionary fallout, they can front-load stimulus spending on national and regional infrastructure initiatives already underway—expanding high-speed rail networks and expediting energy and water projects.

In the absence of immediate funding solutions, the Obama administration takes some important initial steps to break down planning barriers between federal agencies responsible for infrastructure-related programs—departments of Transportation, Housing and Urban Development, Energy, and the Environmental Protection Agency. This more concerted policy-making approach could lead to developing national and regional strategies for helping America's primary metropolitan areas cope with urbanizing suburbs, traffic congestion, and aging or inadequate water, sewer, and power systems. But more needs to be done.

Infrastructure 2010 recommends that government officials and policy experts take effective action, including the following:

- **LEVEL WITH THE AMERICAN PEOPLE** about how the country is falling behind other economies as a result of underinvesting in infrastructure, and explain the true costs of making required upgrades and building new systems.
- **DETERMINE A NATIONAL VISION** for infrastructure improvements that supports the viability of the nation's key metropolitan areas and national gateways—the places that increasingly concentrate economic activity and propel growth.

- **MOVE TOWARD MERIT** rather than formulas in allocating federal funding to state and local governments for infrastructure, and encourage integrated infrastructure, environment, and land use planning.
- **ESTABLISH A NATIONAL INFRASTRUCTURE BANK**, modeled on Europe's success, which can help promote more investment-grade decision making and attract more private capital into infrastructure investments.
- **RAISE REVENUES THROUGH USER FEES**, not only to pay for improvements and upgrades, but also to help gain economic efficiencies and environmental benefits through encouraging changed behaviors—less driving, greater water conservation, and reduced per-capita energy consumption.

Addressing the Water Challenge

While transportation-related issues and energy needs typically dominate infrastructure agendas, ensuring water availability and maintaining water quality also require immediate attention to manage supply and demand. No one can take water for granted. Every U.S. region—including fast-growing metropolitan areas in arid western states and established cities in more fertile zones—faces costly challenges to husband and deliver this precious and essential resource. The federal government as well as state governments must consider how to allocate supplies among competing users—residential, industry, and agribusiness—as the impacts of climate change and increasing population accelerate the urgency of dealing with the water challenge.

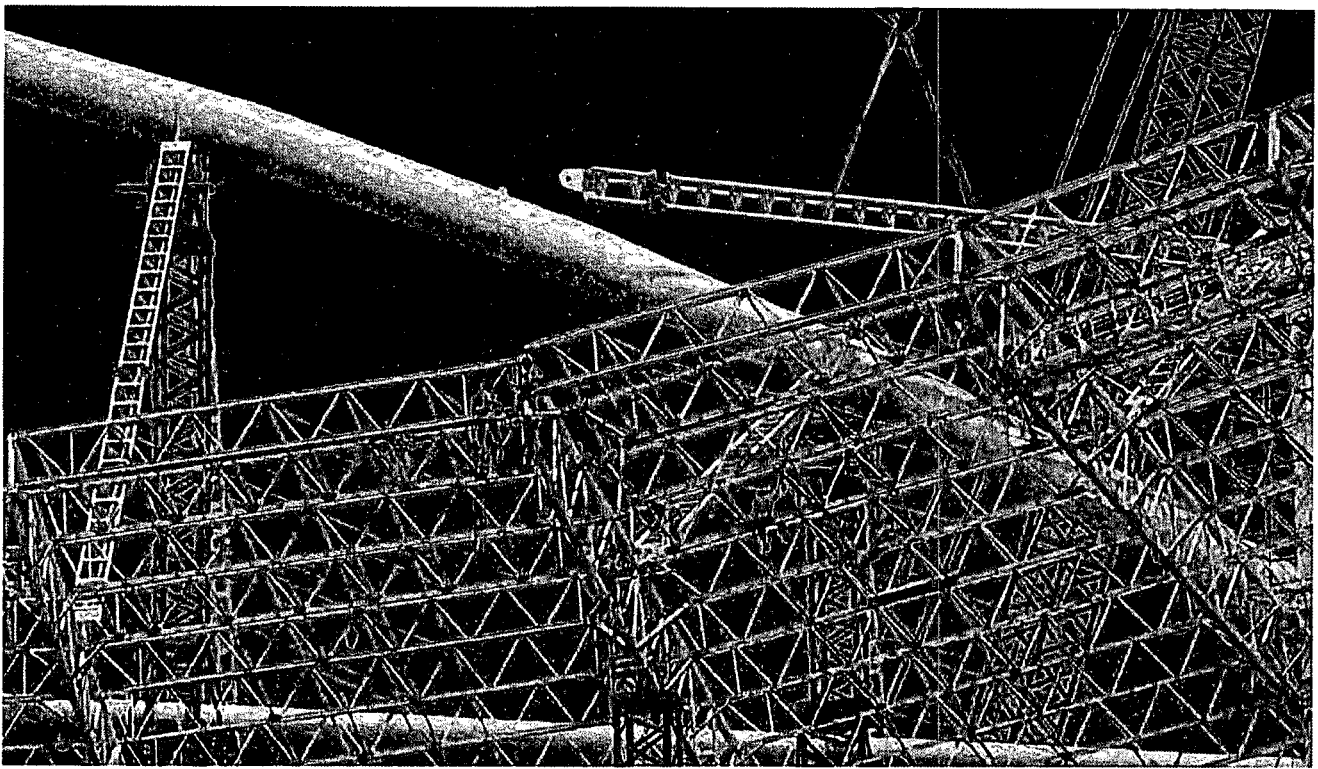
Revamped approaches and implementing solutions are necessary, including the following:

- **REPAIRING AND MODERNIZING OUTMODED SYSTEMS** to reduce leaks in water delivery networks and stem declines in water quality from failing sewage treatment plants.
- **DEVELOPING COLLABORATIVE REGIONAL STRATEGIES** to protect supplies across multiple states and varied local jurisdictions.
- **EMPLOYING PROVEN LAND USE TECHNIQUES** to reduce stormwater runoff and capture groundwater to replenish depleted aquifers.
- **USING INNOVATIVE RECYCLING TECHNOLOGIES** in development projects and for retrofitting existing buildings.
- **FARMING LESS-WATER-INTENSIVE CROPS** and planting less-water-dependent landscaping.
- **IMPLEMENTING CONSERVATION-oriented irrigation systems.**

Internationally, few countries escape water-related challenges. Australia implements innovative adaptation and conservation schemes to deal with parching drought. Many European countries fail to provide reliable water quality, India struggles with inadequate systems, and China copes with contamination and pollution in its water supplies, the result of its break-neck industrialization pace.

Changing How We Pay

How to pay for infrastructure remains a daunting challenge for most countries, particularly the United States, where decades of underfunding now force a massive catch-up effort by deficit-



constrained federal, state, and local governments. Unfortunately, political will appears in especially short supply to tackle mounting problems as cash-strapped households and businesses could buckle under higher taxes. Temporary jobs-based stimulus injections can't address long-term funding of integrated transport networks, power grids, and water systems.

The likely future funding course involves raising revenues from more and higher user fees tied directly to providing necessary investment capital for infrastructure systems, rather than reliance on general taxes, which distort and hide costs from the public. More public/private partnerships can help finance infrastructure development and operate systems. A national infrastructure bank could also help align government and private investor interests, and attract greater private capital. Innovative tolling technologies and smart meters can help users gauge and manage expenses directly related to transportation, water, and energy, encouraging more efficient and less costly lifestyle and business decisions. In turn, enhanced revenue sources should help ensure that Americans have safe, vanguard systems to promote commercial growth and meet quality-of-life expectations.

The Investment Imperative

Investing in infrastructure—done well and strategically—can help ensure increasing prosperity and the rising standards of living that Americans have come to expect. Many countries around the world—China, India, and those in Europe—understand the infrastructure investment imperative and are working to build the transportation, water, and energy systems that will grow their economies for future generations. The United States must find the leadership, will, and resources to do the same.

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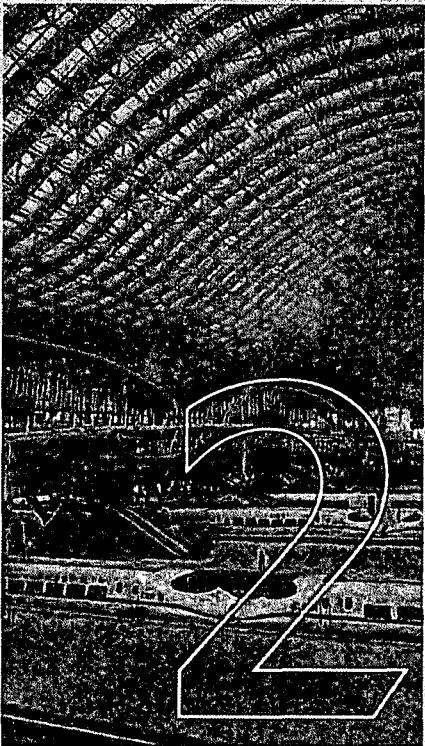
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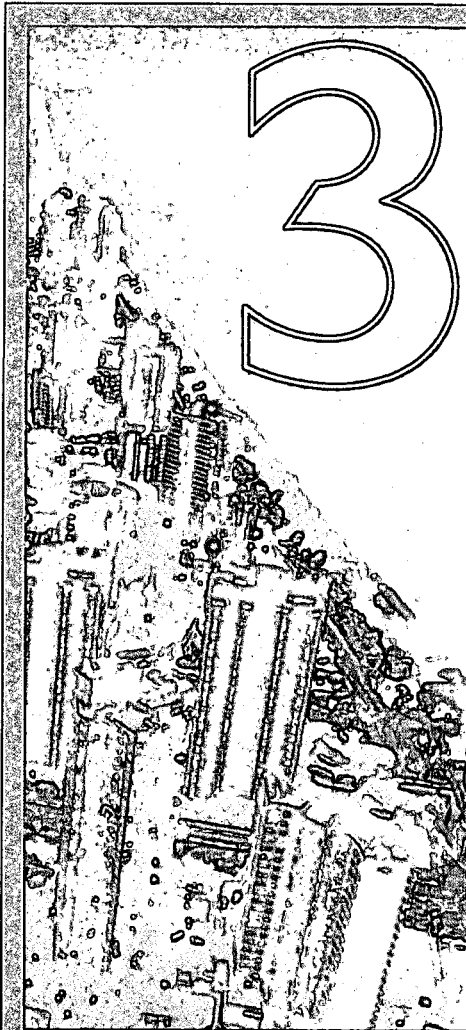
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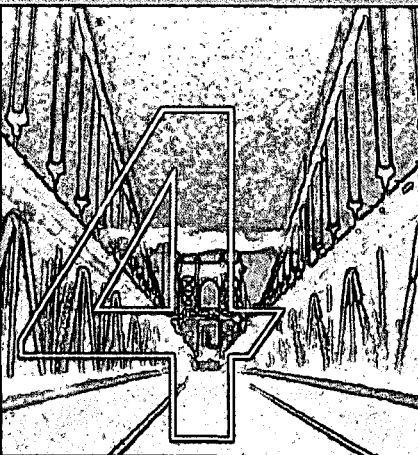
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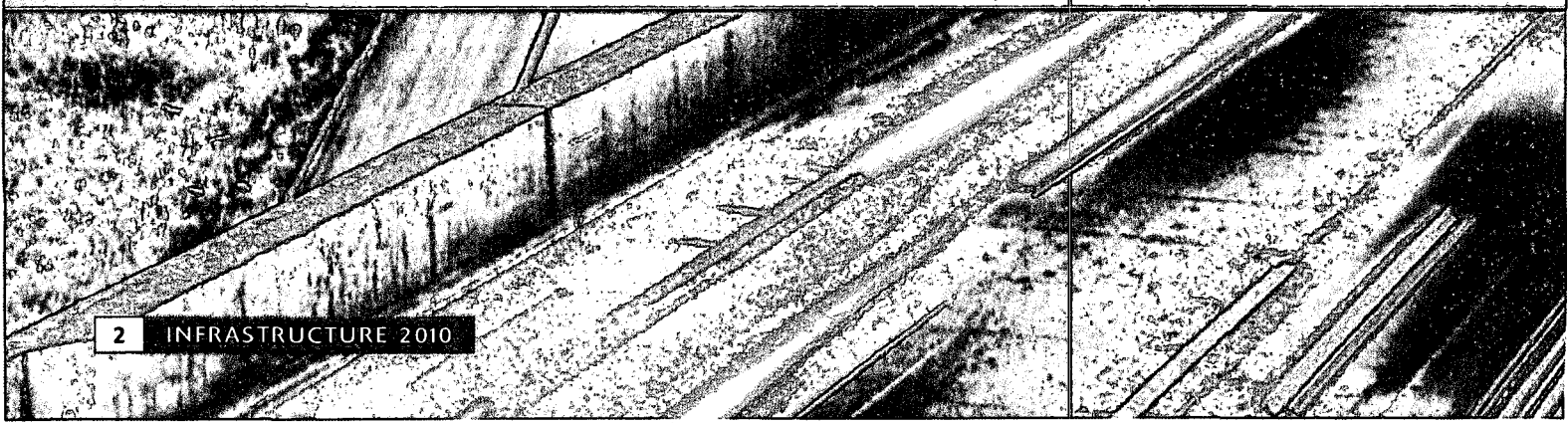
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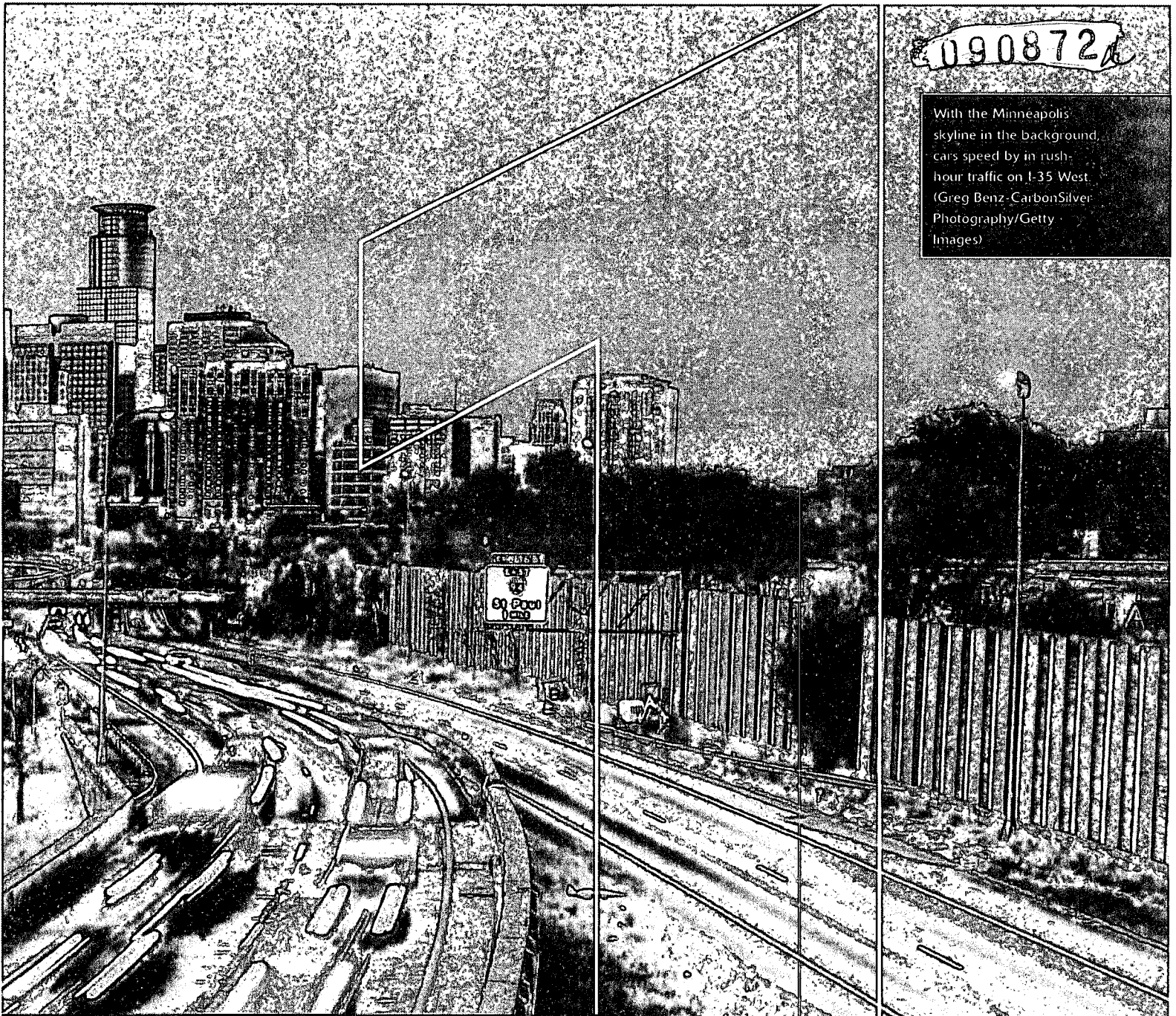


An Economic



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With the Minneapolis skyline in the background, cars speed by in rush-hour traffic on I-35 West. (Greg Benz - CarbonSilver Photography/Getty Images)



Imperative



A backburner issue four years ago when the Urban Land Institute and Ernst & Young initiated the annual infrastructure report series, the state of America's increasingly noncompetitive and deteriorating infrastructure systems—transportation, water, dams, and power—now register significantly greater political and public awareness. Mounting travel delays, more potholed roads and bridge closings,

and increasing sewage backups and water main breaks raise concern in metropolitan areas from coast to coast just as the country struggles to maintain economic competitiveness while emerging from deep recession.

Governors and mayors focus limited resources, including federal stimulus dollars, on repairs and improved maintenance, while many voices call for construction of new state-of-the-art ports, airports, and rail systems. The Obama administration and Congress advance high-speed rail and alternative energy solutions, and many states tackle water availability, quality, and conservation issues, but large deficits constrain options and inhibit the country's ability to formulate and fund a cohesive national infrastructure strategy.

America's global competitors also cope with recessionary fallout, but appear to advance more evolved infrastructure agendas as higher national priorities. In an urbanizing world, rapidly developing nations like China, Brazil, and India race to build new energy plants, high-speed transport, and water filtration facilities, while developed European countries upgrade existing systems and deal with shifting populations and immigrant flows in denser land use patterns. It's clearly no time for the United States to resist the obvious investment imperative—the opportunity costs grow and change accelerates in the global economic race.

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FIGURE 1-1

Incentives and Spending Related to Infrastructure in the 2009 American Recovery and Reinvestment Act

Infrastructure Sector	\$ Billions	% of Total ARRA Spending
Transportation	48	6%
Energy	70	9%
Water	15	2%
Infrastructure Total	132	17%
ARRA Total	787	100%

Source: American Recovery and Reinvestment Act of 2009

A Strategic Necessity

When it comes to infrastructure, the United States finds itself between a rock and a hard place. Economic fallout, competing priorities, and sticker shock prevent the country from aggressively addressing a slow-motion meltdown, the consequence of underinvesting in transport, water, and other networks for the past 30 years. Struggling with enormous public and private debt, the nation is limited in its ability to tackle an escalating and expensive rebuilding challenge. "We're stalled, and in the meantime we're operating on failing systems."

U.S. leaders and policy makers must chart a new direction—spending available resources wisely and strategically. They must help Americans recognize that the nation's relatively affluent standard of living cannot be sustained on infrastructure systems planned and built during the mid-20th century, when the country had only half its current population.

The stakes are considerable. America's future prosperity, world economic standing, and ability to accommodate 120 million more people by 2050 directly depend on bolstering its primary economic gateway cities and metropolitan regions, which produce 90 percent of national GDP. This challenge necessitates integrating housing, transportation, water, and energy with land use in a comprehensive and strategic way.

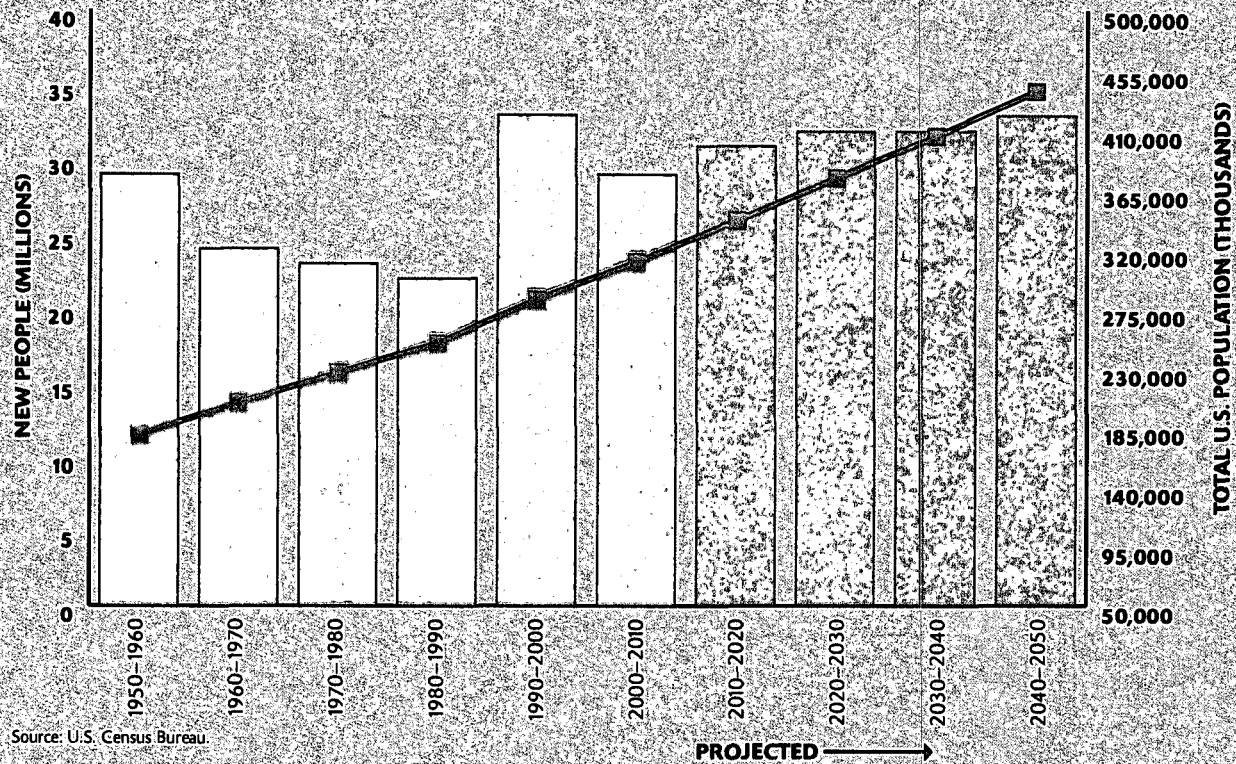
Delay promises only the prospect of steadily ebbing vitality. Indeed, the world order now begins to pass America by as countries in the European Union and Asia—in particular China—continue to implement policies to integrate rail, road, transit, airport, and seaport networks to serve major economic hubs, using 21st-century technologies and systems.

Making headway also requires "an extended conversation with the American people" about necessary change in how the country allocates government funding and resources, raises revenues, finances future projects, and pays for using and maintaining our road, transit, and water systems. Shell-shocked by economic tremors and enmeshed in costly wars, government leaders may understand the problems, but delay long-term infrastructure planning for quicker-fix stimulus bandages whose primary purpose is to boost jobs and relieve uncomfortably high unemployment numbers.

"At least people are talking about infrastructure and beginning to understand the depth of the problem—rhetoric slowly begins to catch up with reality." But that's not enough.

FIGURE 1-2

Every Decade between Now and 2050, the United States Will Add Approximately 30 Million People



Metropolitan Challenges

America is no longer an urban or suburban nation, but a metropolitan one. Inexorably and inevitably, traditional detached-house subdivisions have morphed into more urban environments—apartments and office buildings build up along retail boulevards in inner rings, regional malls transform into urban nodes, and town centers expand around new mass transit stations. America's vast metropolitan regions take different shapes and forms across the country:

- **SUNBELT AGGLOMERATIONS** like Atlanta and Houston fill in dense development between original downtown cores and erstwhile edge cities. Denver reestablishes its downtown to anchor disparate urbanizing satellite centers.
- **IN THE NORTHEAST**, suburban fringes spread well beyond major 24-hour cities—Boston, New York, and Washington, D.C.—merging into a vast megalopolis.
- **SOUTH FLORIDA AND SOUTHERN CALIFORNIA** coalesce into expansive regions of interconnected subdivisions and urban centers.

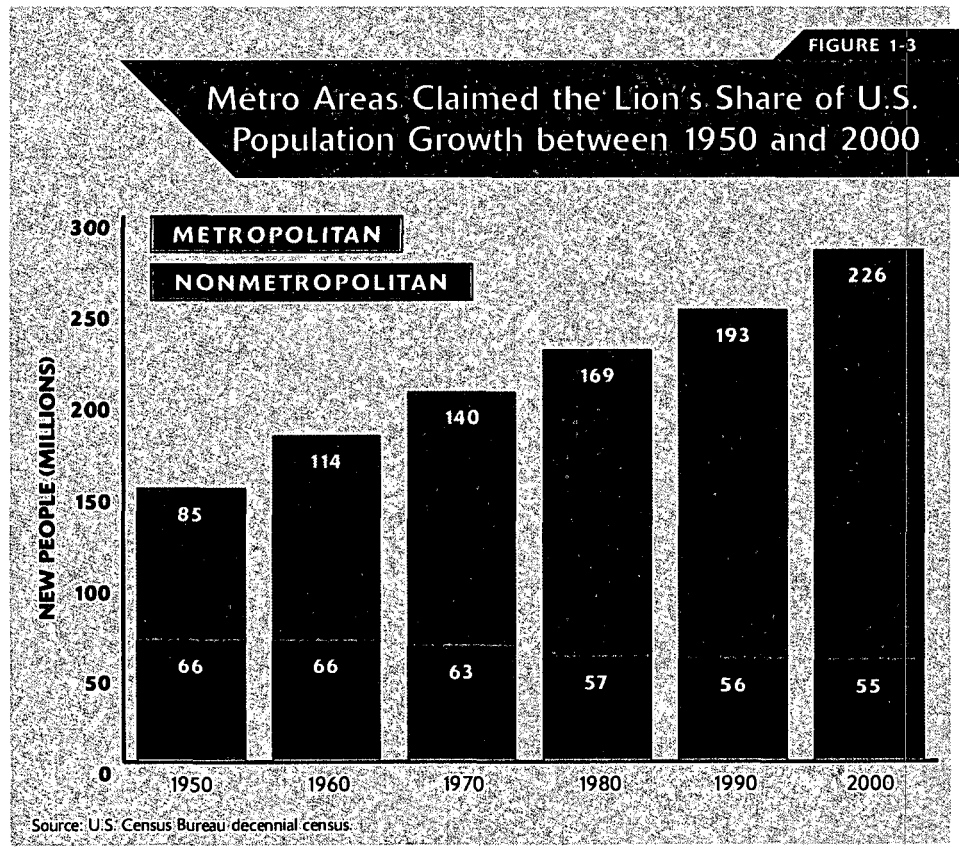
This varied metropolitan landscape has engendered a free-form, car-dependent pattern, heavily subsidized for decades by federal highway and water system funding and later fueled by easy credit in mortgage markets. Left in the wake of ongoing transformation and change is a slew of unsustainable costs and inefficiencies:

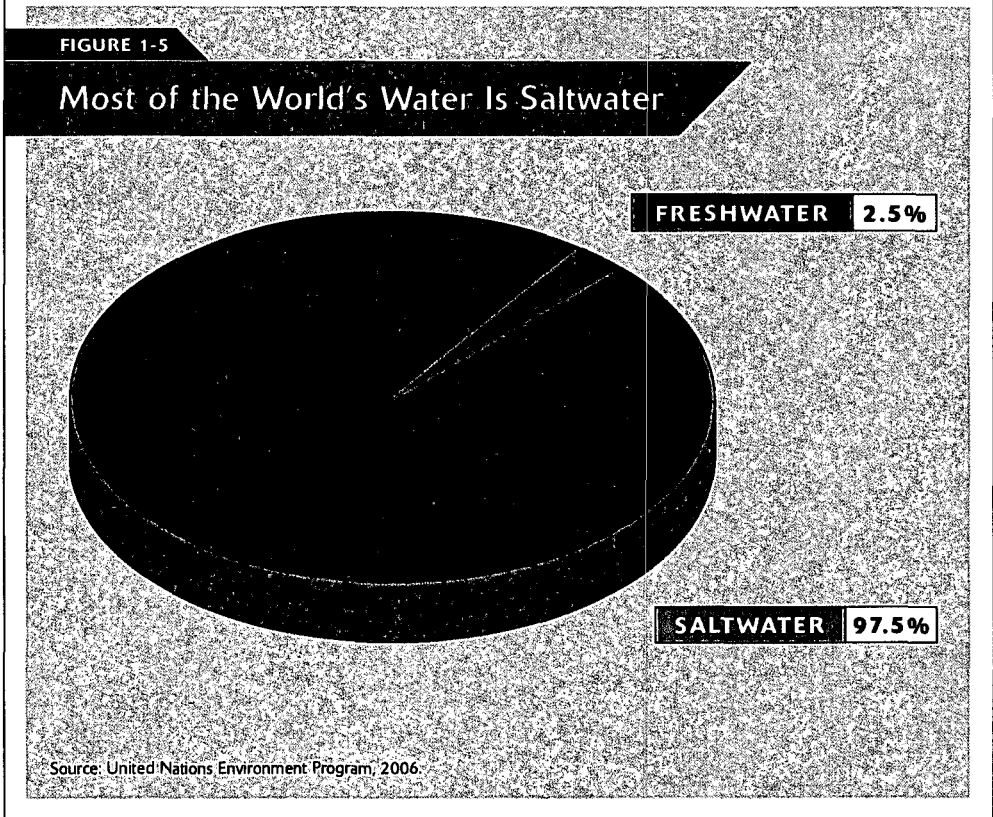
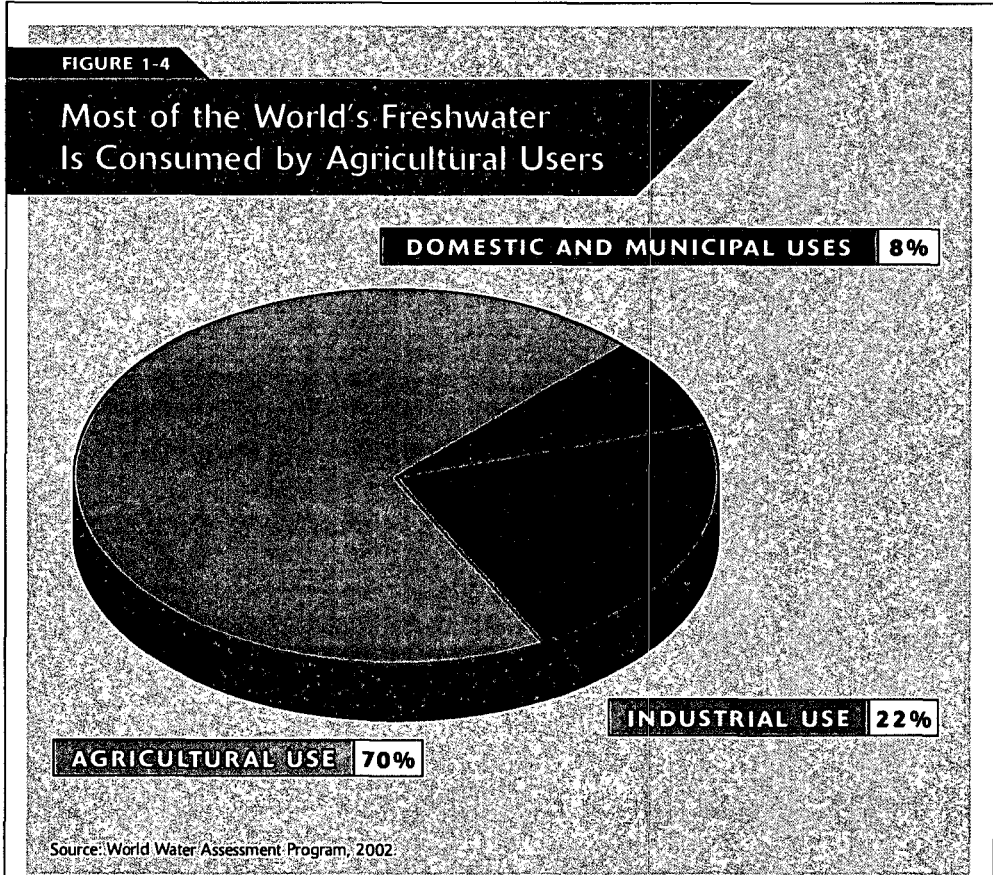
Multilayered Local Governments

Metropolitan sprawl spawned a crazy quilt of overlapping county, town, and municipal governments, not to mention school districts, all taxing local property owners and households to cover considerable overhead for basic services, including police, fire, teachers, and garbage collection. Competing jurisdictions in turn rob each other for precious tax base (typically shopping centers and retailers), destabilizing neighborhoods and commercial districts when businesses move out for better deals. This chock-a-block local governance structure not only perpetuates highly inefficient bureaucracy, but also works against effective regional planning for delivering infrastructure and related services.

Aging and Inadequate Water and Sewer Systems

Taxpayers must pick up the considerable tab for repairing now-aging water pipes and sewers laid a generation ago over long distances to supply sprawling subdivisions. Many mains and sewage treatment plants constructed with federal Clean Water Act monies are reaching the end of their life cycles and require major upgrades. Twenty percent of the nation's





water treatment systems currently fail water drinking standards, and the price tag for water infrastructure alone is estimated to be \$10 billion to \$20 billion per year over the next 20 years.

Increasing Water Costs

Expanding populations and compromised or diminishing water supplies push up costs for pumping, storing, and replenishing reservoirs and aquifers in many regions. Climate change reduces snowpacks and enhances evaporation rates in arid, high-growth Southwest and West Coast population centers. Multiyear droughts recently threatened states in the Southeast—Atlanta is building new reservoirs after almost running dry during a multiyear drought. (Part Three of this report contains an overview of water issues facing 14 major metropolitan regions.)

Expensive Road and Bridge Repairs

Most highway and road building was heavily funded by federal and state dollars decades ago, when the country's economy operated on a high-octane growth curve, and now the bills come due with mounting repairs and resurfacing requirements on countless miles of serpentine asphalt. Either local, state, or federal taxes must increase to meet the burden or older streets will fill with potholes, raising safety concerns and threatening property values. Major bridges and interstate overpasses are approaching the end of their life cycles and will require extensive repairs or replacement. The Bay Bridge in San Francisco and Tappan Zee Bridge north of New York City are two examples.

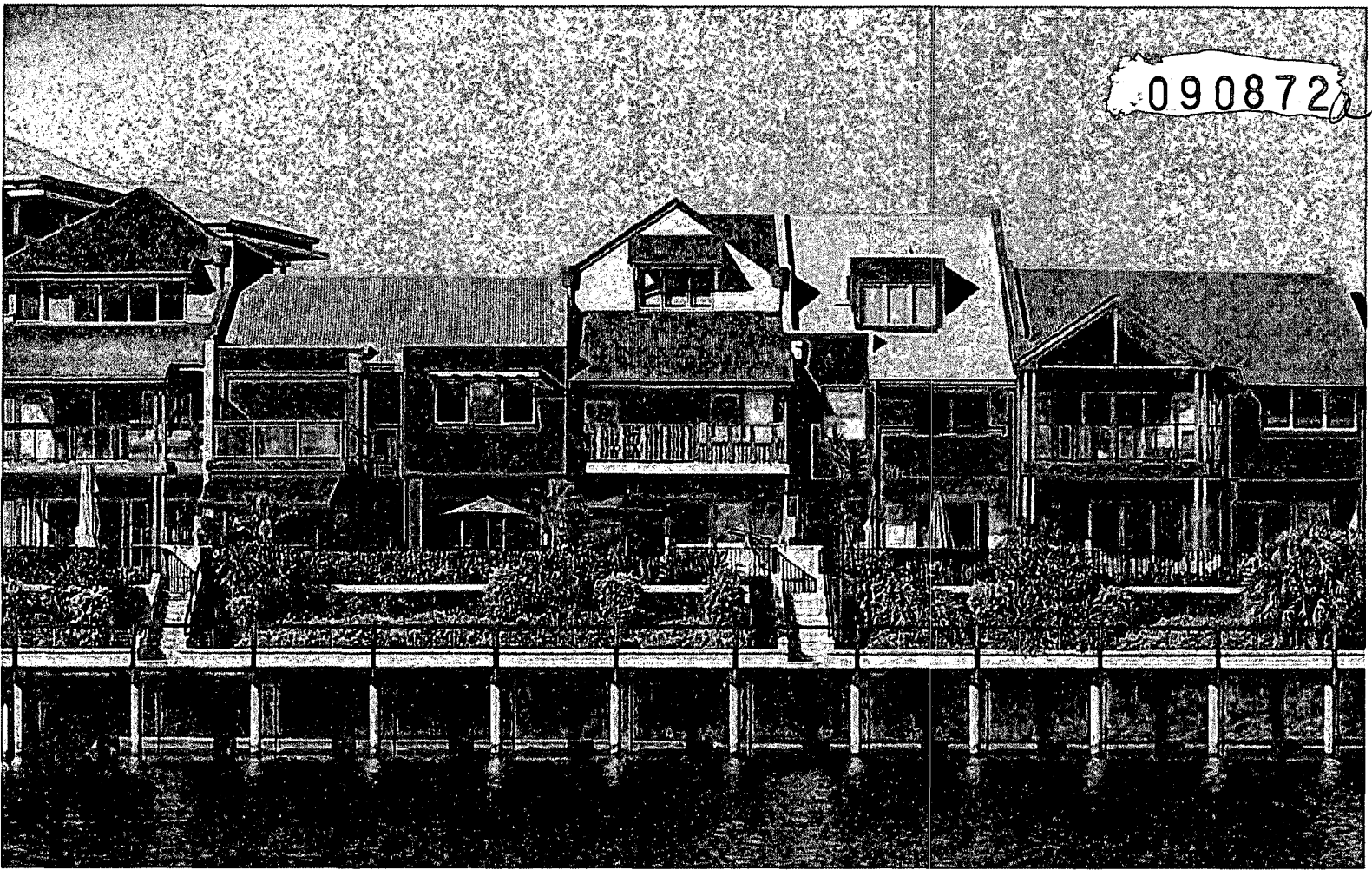
Higher Driving Expenditures

All those roads and the absence of adequate mass transit options in many places orient most Americans toward car-dependent lifestyles. Americans spend an astonishing \$2.7 billion per day on their cars. These expenses (gasoline, auto loans, insurance, regular maintenance, repairs, parking) and time lost in frustrating traffic congestion are increasing to the point of shifting the cost equation in favor of living closer to work and embracing mass transit alternatives where available.

Escalating Homeowner Budgets

The housing market bust sinks home values closer to or below mortgage loans assumed by many borrowers across all income strata—U.S. homeownership rates could drop from nearly 70 percent, their 2007 peak, to close to 60 percent by the end of the decade. Beyond often unpalatable mortgage bills, owners of big houses on big lots face the brunt of increasing costs. Higher energy rates bite hard, increasing monthly utility bills. In parts of the country where water availability diminishes and water rates increase, maintaining lawns and gardens can turn into a pricey headache for cash-strapped homeowners. All these expenses come on top of backbreaking property and sales taxes in some localities, required in part to pay for necessary infrastructure improvements.

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Shifting Sands

American Dream Redefined

This unsettling transformation of lifestyle economies and current financial plights gradually reorder personal priorities and promise to alter many Americans' perceptions of where and how to live "the good life." Reducing driving costs and cutting commutes orient people to consider living in more urban settings closer to workplaces and stores, and near transit stations. Reflecting its popularity, real estate near mass transit stops increasingly fetches premium pricing over drive-only neighborhoods. Recent ULI research, including *Beltway Burden* (for Washington, D.C.) and *Bay Area Burden* (for San Francisco), shows how the increased costs of car ownership and use largely offset savings from cheaper, suburban-edge housing.

Changing demographics also recalibrate where-to-live decision making. The two largest population cohorts—aging baby boomers and their now-young-adult echo boomer offspring—gravitate more toward cities or urbanizing suburb lifestyles. Many graying 50- and 60-something empty nesters consider downsizing and seek greater convenience since they are no longer raising kids in suburban school districts. Later-marrying young adults follow suit—they hope to build careers and find love in hipper urban environs.

Retrofitting the Suburbs

In the face of changing market

preferences and demographics, degeneration, congestion, and poorly planned infrastructure, many suburban communities are beginning to tackle the challenge of retrofitting themselves, offering lessons for other local governments, planners, developers, and commercial property owners. Challenges abound, including a lack of funding, inevitable dislocation, neighborhood backlash, and sheer inertia compromise. But inevitably, suburbs everywhere will confront hard decisions in coming decades about how to maintain their attractiveness and tax base in the face of inevitable change.

Large-scale transit investments help enable densification and the most dramatic makeovers, but ultimately confront daunting hurdles, including:

- negotiating transit rights-of-way through built-out areas;
- fending off lawsuits from disgruntled property owners;
- determining station sites and locating town centers;
- connecting stations to surrounding neighborhoods with pedestrian and bike access to reduce the need for parking and driving;
- refashioning street grids into more pedestrian-friendly designs; and
- most difficult of all—finding the money to pay for typically multibillion-dollar projects.

TYSONS CORNER TEST CASE

Characterized hyperbolically as “the most unpleasant place on Earth,” Tysons Corner, Virginia, a commercial/retail agglomeration outside Washington, D.C., is implementing a \$4-billion plan to overcome ever-mounting traffic congestion and address car dependence. The area features a staggering 167,000 parking spaces in blacktopped lots and concrete decks, which are being made over into more compact development around existing malls and hotels, new Metro train stops, high-rise apartment buildings, and parks.

LIGHTHOUSE IN LONG ISLAND

At the heart of Nassau County on Long Island, the owner of the New York Islander hockey team proposes to redevelop the area around its sports arena into a \$3.7-billion mixed-use town center with apartments, office buildings, stores, hotels, and a new central county transit hub. But the high-density “Lighthouse” project has drawn intense criticism from some locals who fear “Manhattanization” of the suburbs. Many leaders and groups, though, have

embraced the advantages of establishing an urban core to anchor nearby communities and support future growth. Virtually all surrounding districts were developed decades ago into mostly single-family subdivisions lined by typical boulevard-retail strips. Several nearby towns now suffer from suburban degeneration—declining tax bases and failing school districts.

REGIONAL MALL MAKEOVERS

Other projects involve refashioning dead regional shopping centers and outmoded office or industrial parks into mixed-use urban nodes. Early retrofit projects such as Mizner Park in Boca Raton, Florida; Santana Row in San Jose, California; and Belmar (formerly Villa Italia shopping center) near Denver are now spawning others. In fact, eight of 13 regional malls in suburbs surrounding Denver have undertaken or announced retrofit projects, including housing, walkable street grids, and light-rail stations.

Two of the most successful regional malls in the Southeast—Dadeland in Kendall (Miami) and the Perimeter Center, north of Atlanta—collaborate with planners to reconfigure into more mixed-use environments. Dadeland is integrating into a surrounding streetscape and Perimeter incorporates residential towers with proximity to MARTA subway lines.

TRANSFORMING STRIP DEVELOPMENT

Form-based codes and planning guidelines, like those developed for Columbia Pike in Arlington, Virginia, can help resuscitate one-dimensional, strip-retailed road corridors and encourage mid-rise apartment development above and behind streetfront stores served by new mass transit lines.

BACK TO NATURE

Some communities are transforming abandoned malls or grey-field sites into parks and restored nature preserves to serve neighborhoods and deal with stormwater runoff.

In Northgate, Washington, developers turned a mall parking lot into condos, seniors' housing, and a light-rail station. The property is relandscaped with wetlands.

Phelan Village in Minnesota reclaims a failed shopping center and turns cracked blacktop into wetlands and a lake recreation area, serving an adjacent housing development.

Columbus, Ohio, officials plan to redevelop an abandoned regional mall into a park, ringed by housing, restaurants, shops, and office buildings.

Enterprising Gateways Take the Initiative

The nation's major gateway cities are facing infrastructure woes and budget crises. But the good news for pedestrian-friendly, 24-hour cities is that they have well-designed infrastructure in place, which can efficiently serve dense populations. "You can improve on what already exists, instead of building new, costly projects to places with less capacity." The bad news is that much of this infrastructure desperately requires hundreds of billions of dollars in refurbishment and replacement, which budget-busted governments cannot fund. Among the most pressing big-city concerns: 100-year-old water pipes rusting their way toward oblivion, pre-World War I subway tunnels requiring buttressing and new tracks, and critical roadways needing dramatic overhauls. Largely driven by strong local leadership, some cities are using infrastructure to prepare for the next 50 years:

- **BOSTON COMPLETES THE BIG DIG**, cleans up its harbor, builds new bridges, and finishes a new airport/downtown tunnel.
- **CHICAGO UPGRADES ITS TRANSIT AUTHORITY**, expands airports, and incorporates green building standards.
- **NEW YORK CONSTRUCTS NEW COMMUTER TRAIN TUNNELS** and a downtown rail station, while expanding several subway lines.
- **SEATTLE PREPARES TO DISMANTLE** its downtown overpass—the Alaskan Way Viaduct—and reclaim its waterfront district, taking cues from San Francisco's refashioning of the Embarcadero.

But these important gateways, which dominate their regions, continue to suffer from outdated federal programs, which largely fail to integrate national transport planning with housing, energy, and environmental policies. Shortfalls in funding and a lack of coordination threaten to undermine these cities' competitiveness and ability to accommodate expected population growth as well as short-circuit the flow of commerce through increasingly congested metropolitan areas.

Recognizing True Costs

After years of subsidizing and effectively hiding the real expense of building and maintaining infrastructure from users and taxpayers, government leaders now wrestle with whether and how to pay for necessary massive infrastructure improvements at a time when the public calls for belt-tightening. Officials reflexively seem to resist leveling with Americans about the "true costs" of infrastructure and have trouble framing infrastructure programs as investments to ensure future economic growth. Chastened by current economic doldrums and taxpayer distress, they remain averse to linking costs for infrastructure development and maintenance directly to funding mechanisms like tolls and fees. And they consciously avoid jolting voter psyches, even if new user fee policies could be phased in and arguably would lead to lowered overall costs, greater efficiencies (including less congestion), increased conservation, and innovation.

Despite the National Highway Trust Fund nose-diving into insolvency, Congress delays action on raising revenues to help pay for roads and transit either through a gas tax hike or user fee initiatives like tolling interstates. In fact, legislators haven't raised the federal gas tax since 1993.

Establishing a national infrastructure bank, based on Europe's successful model for financing large-scale projects and attracting private capital to support national economic goals, is only starting to interest lawmakers. In the meantime, inertia has its own price: "The more you let things go, the more expensive the costs to fix and rebuild."

Some Signs of Progress

Against this tide, President Obama and Congress allocated \$8 billion in 2009 stimulus dollars for initial funding of regional high-speed rail lines. This \$8 billion sounds like a lot, but it won't go far—it would cover less than 20 percent of the cost for connecting cities in California alone. But at least the country has launched an important passenger rail initiative, and the USDOT is using the program to expand merit-based grant programs.

Some local leaders, meanwhile, have successfully made the case to build new transit systems. From Denver to San Diego, Phoenix, and the Twin Cities, mayors, local councils, and county executives unite to encourage, push, and cajole the public and state leaders to invest in light rail, commuter rail, and bus rapid transit. They argue cogently for how more integrated transit and road networks can promote regional economic growth and help reduce traffic delays. Since 2009, voters nationwide have approved 70 percent of transit-specific referendums, involving dedicated tax increases.

Nonprofit groups are also pushing for change. Groups like Building America's Future—led by California Governor Arnold Schwarzenegger, Pennsylvania Governor Ed Rendell, and New York Mayor Michael Bloomberg—step up advocacy for infrastructure funding and reforming national policy. Transportation for America also helps educate the media and the public about the real costs of maintaining competitive infrastructure.

Following San Francisco's lead in transforming the Embarcadero, Seattle plans to redo its downtown overpass, the Alaskan Way Viaduct. (AP)

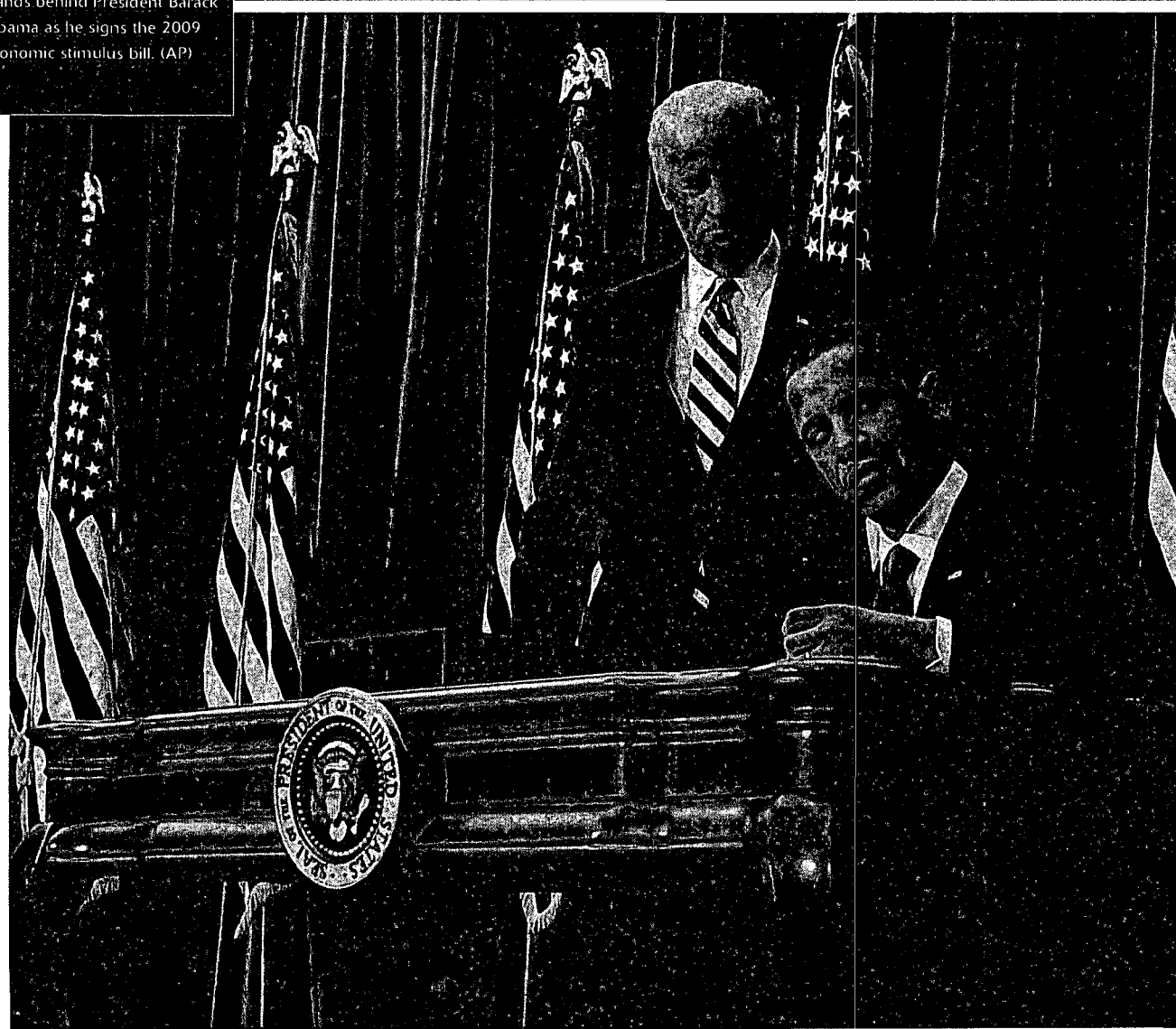


Inevitable Dislocation

On top of contentious budget issues, virtually no official wants to confront the dislocation involved in building new infrastructure corridors for rail, transit, and power lines through existing neighborhoods in major metropolitan areas. It was relatively easy to bulldoze the interstates through mostly greenfields back in the 1950s and early 1960s. But retrofitting built-out metropolises to accommodate new mass transit and passenger rail routes or power grids from solar and wind fields will mean scarring some areas and choosing winners over losers. Investments that are needed for the greater good can easily be mired in costly litigation delays over eminent domain and property rights.

In Texas, for example, protests recently sidelined an ambitious superhighway rail-freight corridor. Electric utilities across the country grapple with where to locate pathways for new power lines to meet renewable energy goals.

Vice President Joe Biden stands behind President Barack Obama as he signs the 2009 economic stimulus bill. (AP)



Assessing the Scorecard

Infrastructure 2009: Pivot Point included a scorecard to assess how the U.S. government is addressing the country's infrastructure needs. Primary recommendations in 2009 were the following:

- **FOCUS STIMULUS FUNDS** into refurbishment and repairs;
- **INCREASE REVENUE** by beginning to raise the gas tax and allow more tolling;
- **APPOINT A DIVERSE NATIONAL COMMISSION** to formulate a long-term national infrastructure strategy;
- **INTEGRATE FEDERAL POLICY**, linking transport policy to energy, environment, housing, and land use initiatives;
- **CREATE A NATIONAL INFRASTRUCTURE BANK** as a true, merit-based underwriting institution; and
- **PASS NEW FEDERAL SURFACE TRANSPORTATION LEGISLATION** that is more integrated and multimodal, and that shifts funding from formulas to merit

To date, here's how we rate progress:

Stimulus: Strong Fix-It-First Focus

Funding from the 2009 federal stimulus bill (American Recovery and Reinvestment Act) focused on creating jobs and priming a sick economy, boosting badly needed fix-it-first projects—potholed roads, corroding bridges, and broken sewer pumps. Allocated mostly through existing federal program silos to states and then down to localities, about \$132 billion of the original \$787 billion in stimulus headed into infrastructure.

In spending the money, the Obama administration tries to encourage “have-your-cake-and-eat-it-too projects,” which offer game-changing improvements like high-speed rail, but struggles with the “slippery slope” of spending on disaggregated schemes and the absence of well-integrated regional infrastructure plans. Although “stimulus has plugged some holes and maybe helped with backlogged projects, it has little long-term impact or solutions.” Unlike the United States, China could pump its stimulus directly into national priorities, including bullet trains, because projects are either on the drawing board or underway.

Stimulus money also provides an opportunity for the administration to experiment with new, merit-based approaches to awarding transportation dollars. But the public's concern about the size of the overall U.S. stimulus package and rising government deficits probably hasn't helped the immediate case for greater infrastructure funding: “It's an example of, ‘Be careful what you wish for’—after all the bailouts, we know what a trillion dollars is and there's no appetite to spend it.”

Formulating National Infrastructure Policy: Initiating Dialogue

Beset by problems on all fronts, the Obama administration manages to initiate a national dialogue on the links between state-of-the-art infrastructure and the nation's future economic health—highlighting the benefits of high-speed rail and power grids for clean energy sources. Some progress

FIGURE 1-6

Innovative Transportation and Finance Programs in the 2009 American Recovery and Reinvestment Act

Program	ARRA Amount	Description
High-Speed Rail	\$8 Billion	This program employed a competitive application process to award federal funding for commuter and high-speed rail investments around the country.
TIGER (Transportation Investment Generating Economic Recovery)	\$1.5 Billion	TIGER awards grants of \$20 million to \$300 million to transportation projects that meet job creation, stimulus, and sustainability and livability criteria. As a mode-neutral, competitive program, TIGER provides a model for merit-based federal funding of future transportation investments.
TIGGER (Transit Investments for Greenhouse Gas and Energy Reduction)	\$100 Million	TIGGER provides discretionary grants to public transit agencies for capital investments that reduce energy consumption or greenhouse gas emissions of public transportation systems.
Build America Bonds	No Limit	This program authorizes state and local governments to issue taxable Build America bonds to finance capital expenditures. Governments receive a direct federal subsidy payment equal to 35 percent of the interest paid to investors.

Source: American Recovery and Reinvestment Act of 2009

also occurs in focusing states and local governments on integrating goals for economic competitiveness, livability, and sustainability into requests for federal transportation funding.

But the country remains a long way from enacting and executing any meaningful new infrastructure policy to address increasingly complex issues involving built-out metropolitan areas, housing for an expanding population, rising energy costs, more limited water availability, and traffic congestion. "We've essentially punted." The sharp partisan divide between Democrats and Republicans in Congress helps to short-circuit discussion about possible solutions. "It's like going to two doctors—one says surgery and the other says exercise, but neither offers anything in between." The ongoing impasse probably serves the purposes of both sides, since neither party can resolve the seemingly insurmountable how-to-pay issues.

Generating New Revenues: No Progress

Efforts to raise gas taxes or impose new user fees like tolls and mileage charges careen into recessionary realities. "That's toxic talk for politicians," even if road maintenance schedules fall further behind and some transit projects get mothballed. Stimulus funding doesn't address the insolvency of the Highway Trust Fund, which remains the primary revenue source for transportation upgrades.

Ultimately, governments (federal, state, and local) must establish and phase in infrastructure revenue mechanisms that directly link amount of use to user cost in order to give drivers, businesses, consumers, and developers signals to adjust behaviors and operate more efficiently. Free roads and free parking encourage more driving, congestion, and emissions. Cheap water enables big lawns and long, hot showers in many regions where limited water resources can't sustain current consumption levels. At the same time, the U.S. government starves for funding to build modern, multimodal transport systems as existing roads and bridges deteriorate and water main leaks increase. "The current course is quite simply untenable."

Silo Busting: Some Positives

Interviewees praise Obama administration efforts to develop environmental, housing, and transportation policies in concert. Through the Partnership for Sustainable Communities announced in June 2009, the secretaries of key federal agencies—HUD, EPA, and DOT—have formally agreed to work together and take a more thoughtful approach on initiatives involving sustainable communities and economic productivity. The agencies are developing specific plans and budget programs to increase coordination and strategic reinforcement of objectives. “This is an important change” that could portend “the beginning of silo busting,” knocking down hurdles that prevent integrated regional land use planning.

Despite these advances, silo-think is far from dead—many federal funding formulas continue to segregate grants into separate buckets for specific road, transit, water, and housing projects. As a result, housing authorities, transit agencies, and transportation departments across the country still do their own thing instead of pooling resources and developing regional solutions and priorities. Metropolitan planning organizations remain largely ineffective.

New Transportation Bill: Gridlock

Reforming infrastructure and transportation funding is low on Congress’s priority list. Jobs, wars, deficits, health care, and homeland security—just to name a few contentious issues—capture more attention. In particular, lawmakers sidestep consideration of the federal transportation program. Efforts to shore up the Highway Trust Fund with general revenues will continue, but the sketchy economy makes meaningful transportation reform—and especially tackling the dicey funding conundrum (higher taxes and/or increased user fees)—more difficult.

National Infrastructure Bank: Stalled

A national infrastructure bank could help entice badly needed private capital to invest alongside public funds on large-scale projects like high-speed rail, new seaports and airports, or electric grid corridors, but other than a few leaders, lawmakers have not taken it up in a serious way.



The Metro Bilbao, a rapid transit system, connects the Spanish city of Bilbao with the rest of northern Spain.

The Long Road Back

America's ongoing infrastructure dilemma encapsulates the country's struggles to sustain a powerhouse economy, overcome mind-numbing deficits, shake off state of denial about future costs, and break through inertia. The following is a roadmap to meet the challenges ahead:

Provide Straight Talk

Ever since President Carter's popularity-deflating "malaise" speech, U.S. politicians have avoided "we're falling behind and need to do things differently" orations—they realize "morning in America" plays better to voters than "evening approaches." But today's realities require a new, more assertive tack. The country's leaders have the responsibility to educate the public about the consequences of underfunding infrastructure, the need for setting national priorities, and the importance of taking action to ensure a brighter future.

Rebuild America

A call to action must follow. Americans hate to lose—the Soviets' Sputnik launch galvanized the nation into winning the space race. Why shouldn't competitive juices be aroused in efforts to sustain living standards and relative prosperity through innovation and engaging the country's best and brightest business leaders, engineers, and planners to advance solutions?

A major "rebuild America"-type investment initiative could both rebuild infrastructure and boost lagging employment. Some interviewees argue that such a jobs program could be patterned after the Great Depression-era public works initiatives that built the Golden Gate Bridge, Hoover Dam, rural electric grids, and other major projects. Rebuild America could identify and fund game-changing, multimodal infrastructure projects to help ensure future economic productivity while creating jobs.

Determine a Vision for Connecting America's Metro Areas

Building on the federal sustainability partnership, the White House should lead federal agencies—including HUD, EPA, Energy, and DOT—in efforts to develop in concert an integrated strategy for revamping intermetropolitan transportation networks, connecting the nation's gateway cities and metropolitan areas, and incorporating regional housing, energy, and water needs. Objectives should include reducing ground and air traffic congestion and accommodating anticipated population growth, "acknowledging and supporting the places that are most important to our economy." Crucial to success will be identifying corridors for separate freight and high-speed rail tracks as well as transmission lines for new renewable power grids.

Regions should be incentivized (through new funding mechanisms) to link into national networks and develop holistic, multimodal transport strategies (including subways, fast-track buses, light rail, and roads). These systems would serve pedestrian-friendly urban cores and urbanizing suburban centers as well as airports and high-speed rail terminals. Regional plans also need to provide for infill housing and recreational areas to accommodate population growth as well as ensure future water availability.

A Daunting Challenge: Reestablishing U.S. Rail Capacity

After a half century of neglect and near-dinosaur status, passenger and freight railroads look like a potential back-to-the-future solution for helping America overcome its looming mobility crisis. High-speed rail could take pressure off airports and road systems for regional intercity travel, and freight trains could help reduce truck traffic in major urban gateways.

Interest is certainly up. The Obama administration has made high-speed rail a key transportation priority. Congress is tuning in to high-speed rail, too. The 2009 federal stimulus bill included \$8 billion in competitive high-speed and passenger rail funding, with additional funding added in annual federal budgets. The House version of the next surface transportation authorization includes \$50 billion for high-speed and passenger rail over five years. Federal dollars are giving a boost to state and local initiatives, already underway, to build high-speed rail and commuter rail.

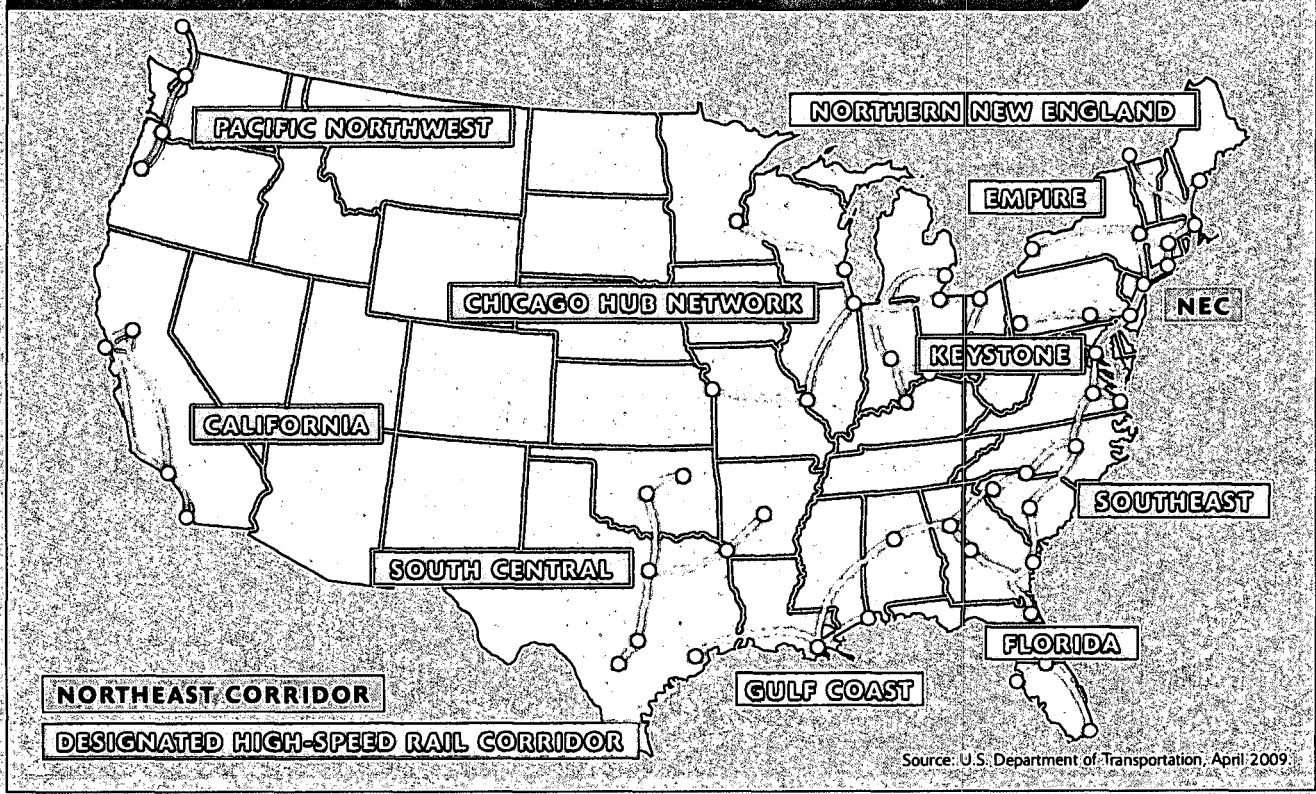
THE COSTS OF CONGESTION

Car dependence and ever-escalating driving delays in most large American cities have exposed the need for more passenger rail service to take the pressure off crowded interstates and clogged airports, which struggle to handle current traffic volumes. The urgency of addressing the issue becomes more apparent since the country's population will increase by 120 million over the next 40 years, with growth concentrated in the nation's primary urban centers and surrounding suburbs. All these people will want to move around and current systems won't be able to handle prospective volumes.

For transporting goods and supplying daily needs, trucks offer tremendous flexibility in point-to-point shipping, but they also contribute to near-gridlock conditions around major U.S. gateways, cause significantly more roadbed wear-and-tear than cars, and generate higher carbon footprints than other transport

FIGURE 1-7

Designated High-Speed Rail Corridors and the Northeast Corridor



Source: U.S. Department of Transportation, April 2009

FIGURE 1-8

Rail Corridors Funded by the 2009 Recovery Act

Regions and Lines	\$ Millions
West Region	2,942
California	2,344
Eugene-Portland-Seattle	598
Midwest Region	2,600
Chicago-St. Louis-Kansas City	1,133
Minneapolis-Milwaukee-Chicago	823
Cleveland-Columbus-Cincinnati	400
Detroit-Chicago	244
Southeast Region	1,870
Tampa-Orlando-Miami	1,250
Charlotte-Richmond-Washington, D.C.	620
Northeast Region	485
New York-Albany-Buffalo-Montreal	151
Boston-New York-Washington, D.C.	112
Brunswick-Portland-Boston	35
Philadelphia-Harrisburg-Pittsburgh	27
New Haven-Springfield-St. Albans	160
Other Awards	27
Iowa	17
Texas	4
Multiple (Planning)	6
Total	7,924

Source: USDOT awards announced January 2010.

modes. Of greatest concern, mounting traffic delays compromise regional productivity in the country's most important economic hubs and ultimately increase business and shipping expenses.

In Chicago, congestion costs the metropolitan area \$7.3 billion a year in wasted time and fuel while sapping nearly 90,000 jobs from the local economy, according to the city's Metropolitan Planning Council. And conditions promise to get much worse. The American Trucking Association predicts that ever-increasing cross-country shipping volumes by 2020 will put 25 percent more trucks on roads. Some heavily congested highways around Chicago, Los Angeles, and New York cargo centers already carry more than 20,000 trucks daily and those numbers could double over the next 25 years.

NEW ATTENTION TO RAIL

Given the stark challenges, it's not surprising that government and business leaders ponder rail solutions to offer some relief to constricted road systems and flight paths. High-speed passenger networks are getting attention as an alternative to regional inter-city travel.

The \$8 billion in 2009 stimulus funding for project seed money generated applications from around the country worth \$55 billion. Initial awards under the program went to investments in Florida, California, and Chicago, with the Northeast trailing in the race for ARRA dollars. Federal money rewarded Florida's advanced rail planning efforts, and California's ambitious plan to link San Francisco and Sacramento with San Diego and L.A., which got a \$10 billion boost in a 2008 state bond initiative. A no-brainer on paper for high-speed rail, the Northeast corridor is bogged down by inadequate coordination among train operators, and was largely passed by in the first round of federal stimulus funding.

Suddenly, America's long-discounted freight rail network is looking like a strategic asset for tempering growth in trucking and its attendant problems. Private investors are interested, too. Warren Buffett made a \$26 billion investment bet on the Burlington Northern Santa Fe Corporation, the nation's second-largest freight rail carrier.

STEEP COSTS

But two significant obstacles stand in the way of ramping up rail use in the United States: a lack of money and absent political will for expanding transport corridors through built-out metro areas. To put costs in perspective, the U.S. High-Speed Rail Association budgets a lofty \$600 billion for constructing and equipping a 17,000-mile (27,359-km) national high-speed rail system over 20 years. A line linking major California metro areas could cost upwards of \$60 billion to \$80 billion alone and a dedicated corridor between New York and Washington, D.C., pencils out to \$10 billion. Obviously, the \$8 billion in stimulus funding won't go far, but it's a start.

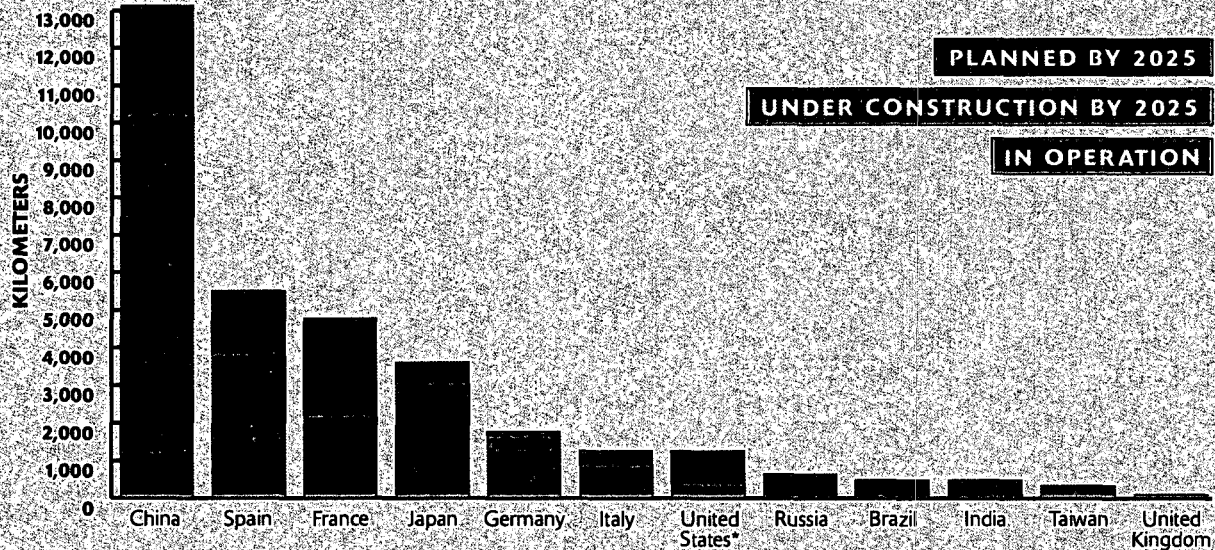
Many experts agree that high-speed rail funds should focus on linking regions and "supporting economic performance and tying into existing transit-oriented development." Topping the list is the Northeast Corridor from Boston to Washington, D.C.; the California line between San Diego and San Francisco; and a Midwest regional system anchored by a Chicago hub.

ALIGNMENT AND UPGRADE CHALLENGES

Besides the steep cost hurdles, fashioning dedicated rights-of-way for faster passenger and freight service runs headlong into formidable local jurisdiction and not-in-my-back-yard (NIMBY) resistance, especially in densely developed urban and urbanizing

FIGURE 1-9

International Investment in High-Speed Rail Is Strong



* High-speed rail is defined as lines or parts of lines that reach velocities in excess of 250 km/hour. The Acela route between Boston and Washington, D.C., is often not considered a true high-speed rail line because it never reaches speeds near those of other high-speed rail systems.

Source: International Union of Railways, 2009

suburban areas. Required environmental reviews also add time and money to projects. Amtrak Acela trains, operating today between Washington and Boston, cannot reach technologically feasible speeds of 150 miles (241 km) per hour because they must share tracks with slower freight haulers. Widening rail beds for separate dedicated high-speed passenger and freight tracks would streamline service while meeting environmental and community challenges at the local level.

Even in the country's most business-friendly and regulation-free states, attempts to revamp transportation infrastructure can face intransigent opposition. An ambitious plan to develop a north-south truck-freight rail corridor from the Mexican border through Texas crashed into insurmountable NIMBY protests, forcing the state legislature to ditch the proposal.

FREIGHT BOTTLENECKS

Freight rail haulers, meanwhile, must overcome the vagaries of a century-old track network designed to deliver coal and steel to now-obsolete factories in the Midwest and ship finished goods from the center of the country to coastal cities for export. Today, the United States has gone from being the world's leading exporter to a net importer and remaining manufacturing shifts to new factories in lower-cost Sunbelt right-to-work states. The country's major seaports on the west and east coasts (Los

Angeles-Long Beach, San Francisco, Seattle, and New York-New Jersey) have become bottlenecks for huge volumes of imports destined for cross-country deliveries—only the recent recession has offered some temporary relief. Interviewees suggest that “the system needs a total redesign from the inside out” to support future needs.

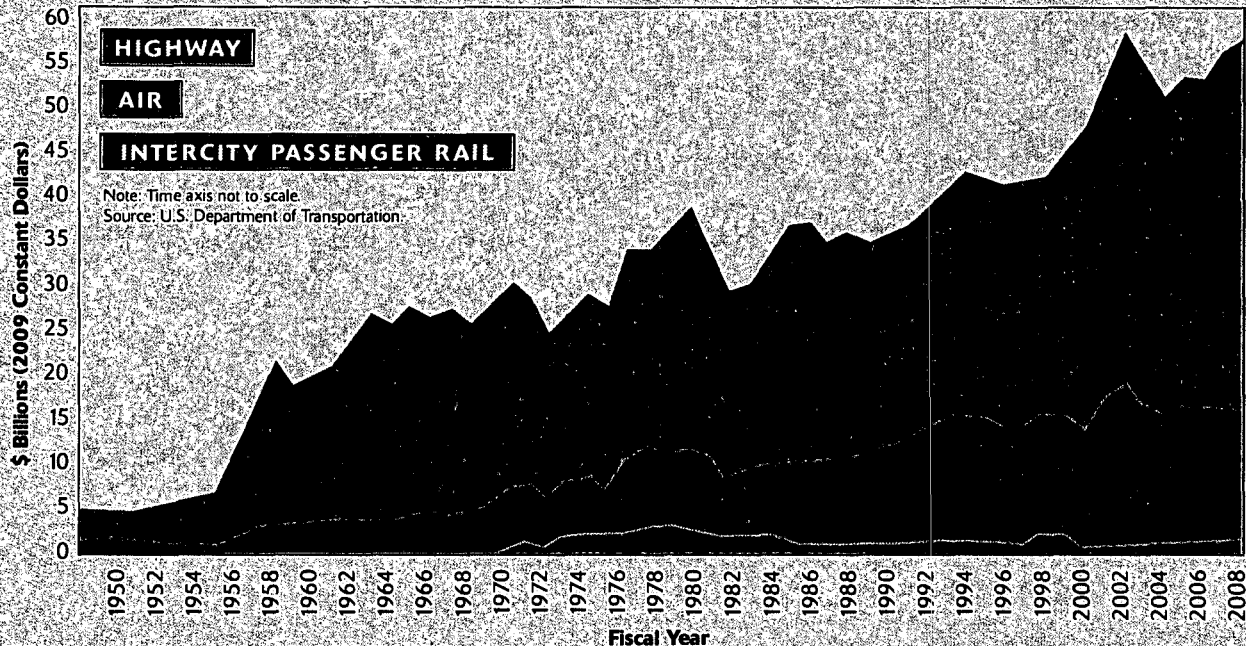
Among transportation planners, appreciation is growing for rail over trucks to solve congestion issues. “Maybe we can fix the work commute if we can take more trucks off road,” says an interviewee. “Since freight shares rights-of-way with passenger trains, it becomes a passenger versus freight battle. But then you don't need to spend as much on high-speed rail.” One way or another, solutions cost money and create winners and losers.

INTERNATIONAL INTEREST

While the United States struggles to plan and fund high-speed rail, other countries are plowing ahead. China, which spent \$8 billion on high-speed rail in 2009 alone, will have a total of 42 high-speed lines in operation by 2012. Spain's AVE train system now links Málaga and Madrid, a journey that once took 24 hours, in just 2.5 hours. In total, Asian and European countries are doubling high-speed rail capacity to close to 13,000 miles (20,921 km) by 2019.

FIGURE 1-10

A Need for Balance: Federal Investment in Intercity Transportation Has Heavily Favored Highways



Reform Federal Transportation Programs

Outdated federal funding models might have served interstate and highway construction, but no longer address complex issues involving the growth and productivity of heavily developed metropolitan regions. Existing silo formulas and earmark allowances also compromise objectives for balancing road and transit spending as well as integrating economic development criteria, climate change goals, and livability standards.

Reformed transportation policy should shift funding from formulas, and use a competitive, merit-based process for allocating more transportation dollars. A new approach that provides **base funding** for localities to repair and maintain infrastructure, **bonus grants** for communities that meet guidelines for integrating infrastructure planning with housing and regional economic development, and national infrastructure **bank** loans to attract private sector involvement and finance projects of national or regional scope is needed.

Buttress Economic Gateways and Metropolitan Areas

Choices and decisions must focus priorities on initiatives that serve the most people and have the greatest impact on national economic growth. Getting the biggest bang for the buck requires strengthening the nation's large metropolitan areas, which concentrate population, business activity, and commerce and link directly into global pathways through international airports and seaports. In turn, these gateway cities must connect efficiently to key

regional commercial centers to support their growth. "In today's global economy, when a country's key gateways falter, the entire nation will suffer the consequences."

Reconfigure Urbanizing Suburban Centers

If thoughtfully planned, emerging suburban town centers and districts surrounding regional malls can be refashioned into multifaceted 24-hour communities, including apartments, retail, office buildings, and parks. These urbanizing centers can support more dense residential development and anchor surrounding single-family neighborhoods. Mass transit networks—including subways, light-rail systems, and bus rapid transit—should connect them to primary business districts and intercity transport terminals for airports and high-speed rail.

Establish a National Infrastructure Bank

Look at Europe's success. Established in 1958, the European Investment Bank (EIB) finances \$64 billion in projects annually across the continent, helping modernize seaports, expand airports, build rail lines, and reconfigure city centers. Few EIB projects have ever defaulted—borrowers repay EIB loans, allowing the bank to continually relend the money. That's arguably not a bad model for the United States, especially considering daunting funding constraints. Following the EIB model, a U.S. entity could carefully underwrite long-term loans (up to 40 or 50 years) and base decisions on a competitive, merit-based process. Private capital will almost surely follow infrastructure bank investments, jump-starting more public/private partnerships and augmenting funding sources.

Pay Differently

Paying for infrastructure systems must become more user-based to synchronize behaviors with costs and benefits and alter habits to gain efficiencies. Building and maintaining roads the way we have been doing—with inadequate gas taxes, supplemented with additional revenues from general funds—hides the true costs from drivers and serves to underwrite and encourage car-dependent, energy-intensive lifestyles.

Technologically feasible mileage fees, new toll systems, and congestion charges can tie vehicle use more directly to road maintenance and inform decisions about where and when to drive. Likewise, if governments stop subsidizing water rates, then homeowners and businesses will be more likely to conserve or make more economic decisions on how they use water. User-based funding schemes could lower general tax rates, pay for systems, and reduce overall burdens on those taxpayers who make more efficient lifestyle and business decisions. User fee systems could also help attract private capital to finance needed projects.

Celebrate Progress

Since many infrastructure improvements require lengthy investment periods and years of disruption, communities must mark project advances and point to future rewards. For generations, Americans have sought to perpetuate—and raise—the standard of living for their children and grandchildren. Investing in infrastructure protects that essential legacy.