

U.S. Transportation-Air Quality Planning: Evolution of Recent Federal Law and Its Implementation

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Abstract

This paper provides an overview of U.S. transportation and air quality planning and governance policies from 1920 to the present, with an emphasis on reform laws enacted since the mid-1960s. It scans some of the key features of relevant laws, progress and shortcomings in governance and administration, technical reform challenges, and political dynamics that have influenced implementation of these statutes. The paper discusses current initiatives by the U.S. Congress and Bush Administration to weaken accountability for the impacts of transportation plans and projects on the environment. The emerging movement towards greater toll-based financing of transportation infrastructure in the U.S. is briefly discussed with respect to its potential for increasing transportation efficiency while protecting the environment and equity.

The U.S. experience suggests public policies, laws, tax structures, and investment choices profoundly shape the infrastructure and technology of transportation and land use patterns, which in turn affect travel behavior and transportation system performance by shaping the choices travelers are given, the price and convenience of different travel modes, and the arrangement of land uses and economic activities in relation to the transportation network, as well as the characteristics of available transportation technologies. Increased public involvement in decision-making, with timely disclosure of information on projects, plans, alternatives, and their likely impacts, has often lead to better decision-making and greater public support for transportation decisions, with improvements to mobility at lower environmental and social cost.

When governance structures have limited accountability, transparency, and public involvement, the product has been transportation systems that enrich the most powerful special interests at the expense of efficiency, equity, and the environment. Growth in use of information and communications systems in transportation and diminishing revenues from gasoline-tax transportation financing opens opportunities for greater use of tolls and other market-incentives to improve system performance and provide revenues that can support not just transportation infrastructure development and operations, but broader social, economic, and equity objectives, such as provision of public transport services, with benefits for air quality and public health.

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I. The Golden Age of U.S. Highway Building: 1920-1966

Federal transportation policy played a key role over the past century in producing America's extensive system of Interstate, regional, and local highways. Beginning with the "good roads" movement in the earliest part of the twentieth century, U.S. road building got a significant push with the establishment of the Bureau of Public Roads in the 1920s, which harmonized engineering standards between states and encouraged creation of statewide primary roads. The 1944 Defense Highway Act laid a foundation for much greater federal investment in road construction with the aim of post-war economic stimulus, providing states with 50% federal funding for new road development. The Interstate Highway Act of 1956 put road construction into even higher gear, with 90% federal funding available to states for construction of what became a 150,000 mile system of limited access motorways and urban beltways, plus additional funding at a lower match for primary state and urban highways.²

But it was the combination of these transportation programs with other federal policies influencing economic activity that gave the biggest stimulus to America's car-dependent suburban sprawl. Post-World War II federal housing programs subsidized low cost mortgages for new suburban homes, but provided no support for renovation of existing or new urban housing. Starting in the 1920s and accelerating in the 1950s, a powerful bipartisan political machine was established to subsidize car-dependence and low-density suburban development, just as massive relocations of low skill rural migrants were headed for older and increasingly decayed urban neighborhoods. Tax-exempt mortgage financing helped spur middle class urban residents to move to new car-dependent suburban homes, but left behind urban neighborhoods with a declining tax base, populated by residents with disproportionately lower incomes. Official and unofficial racial segregation was reinforced by "redlining," the systematic denial of home insurance and capital lending services to residents and businesses in lower income and minority neighborhoods, contributing to further urban decay.³

Public education, dependent on highly local property taxes, fell into increasing distress in older, lower income, and minority communities, furthering white and middle class flight from the cities and increasing the concentration of urban poverty. Erosion of the manufacturing job base in urban areas constituted an economic deathblow to many communities, driving up unemployment and further eroding the tax base of declining income neighborhoods. Except for some dense downtown commercial development, in most American cities in the mid-20th century, the locus of job and housing growth and the place for safe investment became the American suburbs.

Strong state highway departments and in some cities, regional transportation authorities were nearly unquestioned decision-makers in this period and often acted on behalf of well organized road industry and suburban real estate development interest groups, using 80% or 90% federal funds or toll revenues to advance new highway construction. Robert Moses, the acclaimed as a "master-builder" in New York City for much of the century, epitomized the approach used by many road builders, bulldozing urban and rural areas

² Smerk, George, *Urban Mass Transportation: A Dozen Years of Federal Policy*, Indiana University Press, Bloomington, Indiana, 1974, p.14.

³ Jezer, Marty, *The Dark Ages: Life in the United States 1945-1960*, South End Press, Boston, 1982, p.140.

and parks with little or no advance public notice, using the power of eminent domain and the purse of toll revenues and at times federal or state funds to reshape cities with new roads.⁴

Until the mid-1960s few laws stood in their way and a mostly uncritical press lauded their work. Indeed many of these road projects spurred economic development, jobs, and growing profits for suburban real estate developers, construction firms, and those in the automobile and oil industry. Roads were filled with traffic jams often only weeks after opening, generating more traffic, but little congestion relief. In their wake many neighborhoods were destroyed, parks and streams obliterated, farms cut in half, and livelihoods crushed, and residents and small businesses had little opportunity to stand in the way of this "progress" or to win fair compensation for their often difficult to quantify losses.⁵ The result was a vast increase in mobility, sprawl, and economic activity, as well as a reinforcement of spatial separation of residents on the basis of race and class.

In the 1920s and 1930s, and continuing through the 1950s, automobile and petroleum interests had begun secretly buying up public transportation systems, which had served a very high share of homes and businesses in metropolitan areas and towns the early 20th century. Through holding companies, such as National City Lines – owned by General Motors, Firestone Rubber, and Standard Oil of California, systematically eliminated public transportation services or replaced fast electric trolley and train services in hundreds of cities with inferior diesel bus services that were in turn delayed by growing traffic congestion.⁶ Public transportation services were also systematically excluded from the new suburban areas to further racial and class separatism. Some highway agencies went so far as to deliberately design bridges on new highways too low for buses to pass in order to keep public transportation dependent minority residents from traveling to segregated white suburban parks, jobs, and housing.⁷

By the late 1950s and early 1960s many American public transportation companies were on the verge of collapse, caught in a death spiral of rising fares, service cutbacks, neglected maintenance, and lack of any system expansion, rehabilitation, or modernization, with obsolete equipment, poor management, and bankrupt finances. "So decrepit and deplorable was the state of mass transit and commuter railroad service and the quality of equipment that for people who could afford the choice, there was no suitable alternative to the use of the automobile in most U.S. cities."⁸ Ridership plummeted until the mid-1970s, falling to only about a third of its 1945 level.

Federal transportation investment policy further contributed to this collapse of public transportation. Between 1961 and 1966, the U.S. government spent \$24 billion on highways, airways, and waterways compared to only \$0.375 billion on public transportation programs.⁹ State and local government aid to public transportation before

⁴ Caro, Robert, *The Power Broker*,

⁵ Jezer, Marty, *op.cit.*

⁶ Robert Snell, *Report on American Ground Transport*, Subcommittee on Antitrust and Monopoly, Senate Judiciary Committee, February 26, 1974, p.28-32.

⁷ Caro, Robert, *op.cit.*

⁸ Smerk, *op.cit.* p.14.

⁹ Pucher, John and Christian Lefevre, *The Urban Transport Crisis in Europe and North America*, MacMillan Press, Ltd., London, 1996, p. 191.

the mid-1960s was minimal, with virtually all state transportation spending devoted to highway construction and operation in most states. State transportation spending was and to this day continues to be substantially supported by state gasoline taxes and motorist user fees, which since the 1920s have been in the majority of all states constitutionally restricted for highway investments, and thus unavailable for improvement of public transportation, sidewalks, bicycle facilities, or other transportation options.¹⁰

II. Freeway Revolt and the First Wave of Transport and Environmental Reform: 1966-1990

The effects of the massive highway investment in the post-World War II period were profound, complex, and had a lagged effect on urban form. In response to the collapse of public transportation systems in the mid-1960s, urban officials, economic development interests, and the public pressed for increased government support for public transportation, which rose from \$0.518 billion in 1970 to \$15.051 billion in 1992. However, government expenditures for roads continued to rise from \$20.8 billion in 1970 to \$84.3 billion including a rise in general tax subsidies (vs. road user fees and taxes) for roads from \$10.6 billion to \$23.5 billion a year.¹¹ And it took years before the full effects of induced sprawl development and traffic growth spurred by continuing highway expansions were played out in the marketplace. Increases in government support for public transportation from the 1960s through the early 1990s successfully arrested the sharp decline of transit ridership and generated modest growth of 9% between 1970 and 1990, while vehicle kilometers of travel in urban areas rose 124% during this same period, encouraged by continuing deep structural subsidies for suburban sprawl development.

At the community level, across much of America, in the mid to late 1960s, a popular "freeway revolt" took hold as citizen groups demanded new federal laws to protect them and their communities and parks from overly powerful state highway agencies and transportation authorities and to insist on public and local government involvement in decision-making with full disclosure and evaluation of project designs, impacts, and alternatives before decisions were finalized. This led to several important changes in law:

A. Protections for Historic Resources, Parks, Recreation Areas, Wildlife and Waterfowl Refuges. On October 16, 1966, President Johnson signed into law two statutes - the Department of Transportation (DOT) Act and the National Historic Preservation Act.

Section 4(f) of the DOT Act prohibits transportation agencies from taking or harming in any way historic properties, parks, recreation areas, wildlife and waterfowl refuges unless there is "no feasible and prudent alternative," and requires "all possible planning to minimize harm." [49 U.S.C. § 303(c)]. The Supreme Court later found that an alternative is not prudent if it would result in "unique" or "truly unusual" problems, or

¹⁰ In more than 30 states constitutions or statutes continue to limit the expenditure of transportation user fees for anything other than highway improvements. See: Amalgamated Transit Union, *TEA-21 Reauthorization Proposal: Next Stop: Real Choices*, May 2002, Washington, DC.

¹¹ Pucher and Lefevre, *op.cit.*, p. 182-183.

“cost or community disruption of extraordinary magnitude” [*Citizens to Preserve Overton Park v. Volpe*, 401 U.S. 402 (1971)]. Subsequent court cases have required that, if multiple alternatives will use historic properties, the DOT must select the one that is “least harmful” to properties protected by Section 4(f), unless it is shown to be “not feasible and prudent” for *other* reasons [e.g., *Druid Hills Civic Ass’n v. FHWA*, 772 F.2d 700 (11th Cir. 1985)]. This law first major environmental law applied to road projects has proven to be one of the strongest substantive requirements on transportation agencies in the design and planning of transportation projects.¹²

Section 106 of the National Historic Preservation Act created separate and distinct standards, procedures, and enforcement mechanisms to ensure the review of transportation projects for their potential impact on historic resources alone. These weaker procedural requirements of Section 106 [*Compare* 49 U.S.C. § 303(c) and 23 C.F.R. § 771.135 *with* 16 U.S.C. § 470f and 36 C.F.R. Part 800] involve state historic protection officers in evaluating and negotiating mitigation measures with respect to highway or transit projects, but do not create a substantive standard of protection for historic resources. Section 106 procedures have proven valuable in fostering an interagency process for trying to resolve conflicts with regard to transportation project impacts on historic resources, while Section 4(f) has provided communities with valuable negotiating leverage against much more powerful transportation interests.

B. The 1969 National Environmental Policy Act (NEPA). Sometimes called the "Magna Carta" of U.S. environmental law, NEPA was enacted to ensure consideration of the environmental impacts of major actions taken by federal agencies. It requires the agency responsible for such actions – including transportation agencies – to prepare a detailed environmental impact statement (EIS) which includes "(i) identification of any adverse impact of the proposed action, (ii) any adverse environmental effects which cannot be avoided should the proposal be implemented, and (iii) alternatives to the proposed action" (102, 42 U.S.C. § 4332), among other requirements. NEPA has been hailed "as a benchmark of the administrative revolution [that] has instilled an environmental conscience in the federal government...Its spirit and letter have been emulated at the state and local levels in [the U.S.] and at all levels of government in countries across the globe."¹³ However, NEPA is generally considered to entail procedural but not substantive requirements on agencies, for example requiring consideration of less environmentally harmful alternatives, but not requiring selection of those alternatives by the implementing agency.¹⁴

The Federal Highway Administration (FHWA) issued regulations (23 CFR § 771), [Environmental Impact and Related Procedures](#)¹⁵ and guidance as a Technical Advisory (T.6640.8a), [Guidance for Preparing and Processing Environmental and Section 4\(f\)](#)

¹² National Trust for Historic Preservation fact sheet on Section 4(f) and Section 106.

¹³ Tripp, James T.B., and Nathan G. Alley, "Streamlining NEPA's Environmental Review Process: Suggestions for Agency Reform," *New York University Environmental Law Journal*, Vol.12, No.1, 2003, p.75.; see also Gray, Kevin R., *International Impact Assessment: Potential for a Multilateral Environmental Agreement*, 11 *Colorado Journal of International Environmental Law and Policy* 83, 89, 2000.

¹⁴ Tripp and Alley, *op.cit.*, p.85.

¹⁵ <http://environment.fhwa.dot.gov/projdev/impcf0771.htm>

[Documents](#).¹⁶ Additional guidance and information on the NEPA process and other environmental requirements are found in the FHWA [Environmental Guidebook](#).¹⁷

NEPA has been a valuable tool for expanding the U.S. public's right to know about the impacts of major transportation projects before they are built and to win consideration of impact mitigation or avoidance strategies. Many projects have been improved due to the environmental review process, such as the I-70 highway across Vail Pass in Colorado, the Route 50 project in the northern Virginia Piedmont, or the U.S.93 project in Montana.¹⁸

Yet NEPA's implementation has left many transportation and other agencies frustrated with what they see as costly and time-consuming process requirements that at times do little to change the final outcome from what the agency decided earlier in its planning process. NEPA has also left many citizens and environmental stakeholders frustrated as many transportation and other agencies –

- ? fail to consider meaningful alternatives that could avoid adverse impacts,
- ? segment projects into many smaller actions that each avoid a significant impact threshold,
- ? fail to consider secondary, indirect, and induced impacts as the law requires,
- ? bypass the public involvement of the EIS process by use of "mitigated EAs", which enable the agency to issue a FONSI on the basis of what prove to be unenforceable mitigation agreements that supposedly will reduce the adverse impacts of the project to a non-significant level.
- ? abuse the categorical exclusion process by administratively exempting from environmental review projects with major impacts.

It is most often the case that an agency believes its proposed action will not have a significant impact on the environment, in which case the agency may prepare an environmental assessment (EA). This light-duty evaluation may result in a decision to prepare a full EIS or to make a finding of no significant impact (FONSI), justifying the decision not to prepare an EIS, and thereby reducing public involvement requirements for project appraisal and planning. Through administrative law and statute, many projects and decisions have been categorically excluded (CE) from environmental review requirements, which has at times led to practices that some believe violate the spirit of NEPA (especially for general purpose road widening projects permitted under 23 CFR

¹⁶ <http://environment.fhwa.dot.gov/projdev/impTA6640.htm>

¹⁷ <http://environment.fhwa.dot.gov/guidebook/index.htm>

¹⁸ Sierra Club, *The Road to Better Transportation Projects: Public Involvement and the NEPA Process*, Washington, DC, August 2003. <http://www.sierraclub.org/sprawl/NEPA>

Montana, US-93: NEPA Public Involvement Prompts Creative Solutions

US-93, north of Missoula in western Montana, faces increased congestion from traffic heading toward Glacier National Park. The Montana Department of Transportation (MDT) proposed to take a 56-mile, two-lane segment of Route 93 and change it into a five-lane, undivided highway.

This segment runs through the unique cultural landscape of the Flathead Indian Reservation, including territory in the heart of the Rocky Mountain ecosystem and the Ninepipe Wetlands Area, an ecosystem with thousands of kettle ponds supporting unique and fragile species of wildlife.

Under NEPA's rules, the Confederated Salish and Kootenai tribal government and grassroots citizen groups such as Flathead Resource Organization (FRO) were able to challenge MDT — first, on the validity of the initial Environmental Assessment (which evaluated only a seven-mile stretch of the 56-mile project) and later on the Environmental Impact Statement (EIS). Federal agencies are required to make and evaluate EIS reports in order to determine the consequences of a proposed action, analyze action alternatives, and share the results with other agencies and the public.

By forcing MDT to do an EIS, tribal members and citizens made MDT look for creative solutions and consider alternatives for the highway, which could negatively affect safety, environmental issues, and lack of protection for tribal culture and family farms. A Federal Highway Administration decision stipulating that the tribes and MDT must agree on the project design prompted them to hire landscape architect Jim Sipes of Jones & Jones (a firm based out of Seattle, Washington).

Sipes helped create a final design agreed to by all government entities involved. Sipes's design addressed safety, environmental, and cultural concerns about sprawl. Slow curves in the roadway are planned along the most scenic areas of the route to discourage speeding and follow the contour of the land. One mile of the highway will be relocated around the Ninepipe Wetlands area. Additionally, an unprecedented 42 wildlife crossings and wildlife fencing will be added at the request of the Tribes to reduce harm to area wildlife.

Amanda Hardy, research ecologist at the Western Transportation Institute at Montana State University, is involved with the design and evaluation of the wildlife crossings. She said NEPA allowed "the public and agencies an opportunity to comment" so alternatives like these could be pursued.

"US-93 became a project dramatically different than what the DOT had ever done," said Sipes. "NEPA gave us more weight so our voices could be heard — without it, US 93 would have been a standard four-lane highway with destructive impacts to the community," he added.

This case study extracted from: Sierra Club, *The Road to Better Transportation Projects: Public Involvement and the NEPA Process*, Washington, DC, August 2003.
<http://www.sierraclub.org/sprawl/NEPA>

Portland, Oregon: Making the Land Use, Air Quality, Transportation Connection

Portland is a model for how some U.S. communities have worked with federal, state, and local law to better manage growth with an urban core of higher density neighborhoods, and ringed by green open spaces that restricted sprawl, supported by transit-focused transportation policies and limited investment in new highways. In the early 1970s a group of concerned farmers and environmentalists helped persuade Oregon lawmakers that the state's natural beauty needed protection against unrestrained growth and mushrooming sprawl. In 1973, the state adopted the nation's first set of land-use planning laws that required every city and county in Oregon to start developing blueprints for growth that "set urban growth boundaries," "used urban land wisely" and "protected natural resources." About that time, Portland was among the first of U.S. cities to take advantage of a new law allowing the use of federal Interstate highway funds for transit investment, which went into creating the area's first light rail line. As a result of these and other measures, Portland's serious air pollution problem within a decade was brought under control.

But by 1988, population pressures in the city were mounting, along with traffic congestion. When the Oregon Department of Transportation announced its plans to build a new freeway (called the Western Bypass) to circle the west side of Portland, few were surprised, since the project had been talked about for years and was considered a "done deal." But many residents were alarmed by a highway project that seemed to embrace the notion that more roads and sprawl were inevitable to a growing populace - and upset that members of the local community had not been given the opportunity to voice their opinions. So a handful of citizens and local groups got together and decided that there must be a better way, one that didn't cater to only those who could afford or were able to drive cars.

Out of those initial meetings was born the LUTRAQ Project (Making the Land Use, Transportation, Air Quality Connection). A coalition spearheaded by the group [1000 Friends of Oregon](#), developed an alternative plan that combined an expanded public transit network with incentives (like parking pricing and transit subsidies) with a new land-use plan that shifted growth from low density car-dependent areas into bicycle- and pedestrian-friendly, transit-oriented centers. The group was able to demonstrate clearly that their proposal would actually reduce congestion and traffic jams significantly more than the bypass, at lower cost.

After years of public debate, Oregon DOT in the early 1990s incorporated the LUTRAQ scenario as a reasonable alternative that might minimize adverse impacts in their EIS for the Western Bypass, ultimately selecting it as the preferred alternative. The West Side Light Rail that was at the heart of the transit oriented development investment was built, local governments in the area revised their local zoning to support transit-oriented development, and the initiative proved highly successful.

By 1995, the region's officials had adopted a new metro charter involving a democratically elected regional government and the 2040 regional Growth Concept, based largely on the LUTRAQ approach, with extensive further public involvement. Since the adoption of the 235,000-acre growth boundary in 1979, Portland has urbanized just 39,000 acres. At the same time the population inside the boundary has increased by more than a third. No new road capacity has been added to the downtown for nearly a quarter century, although employment has nearly doubled in that time to 109,500.

For more information see: <http://www.environmentaldefense.org/article.cfm?ContentID=2657>

771.117 (d)1 and (d)2). A recent study by the American Association of State Highway and Transportation Officials (AASHTO) found that fully 92 percent of environmental documents processed by state DOTs are CEs, which require no public involvement. Environmental Assessments (EA) make up seven percent, with full Environmental Impact Statements (EIS) rounding out the sample at less than 2 percent.¹⁹

An example of the misclassification of a highway project with major impacts is the expansion of I-287 in New Jersey in the mid-1990s. This 4-lane limited access Interstate highway (I-287) formed an outer beltway around metropolitan New York City and was proposed for widening to 6 to 8 lanes, in some places for general traffic, in other places for High Occupancy Vehicle (HOV) lanes. NJ DOT advanced the project as a CE, citing Federal Highway Administration (FHWA) regulations adopted during the Reagan Administration, which to this day continue to allow the categorical exclusion of highway widening projects from full NEPA review if the lanes are added inside the existing highway median area. In this case, the widening of I-287 impacted significant wetlands and clearly would produce substantial induced changes in traffic and land use. Only after NJ DOT was sued by environmental groups did the agency prepare an environmental assessment, but ultimately failed consider these impacts in the review process.²⁰ The road was built, and indeed contributed to substantial induced traffic and sprawl in the corridor. A few years later the HOV lanes were converted to general purpose lanes, again without further environmental impact review, further spurring traffic and sprawl.

C. Clean Air Act of 1970.²¹ The Air Quality Act of 1967 gave States responsibility to issue and implement air quality standards, and in the words of Justice Rehnquist, "the States generally retained wide latitude to determine both the air quality standards which they would meet and the period of time in which they would do so." Train v. Natural Resources Defense Council, 421 U.S. 60, 64 (1975). It became evident this approach was insufficient to respond to acute health problems caused by growing air pollution and political challenges posed by the rise of the environmental movement, so Congress adopted the Clean Air Act of 1970.

"[A] drastic remedy to what was perceived as a serious and otherwise uncheckable problem of air pollution," Union Electric Co. v. EPA, 427 U.S. 246, 256 (1976), the 1970 Amendments "sharply increased federal authority and responsibility in the continuing effort to combat air pollution." Train, 421 U.S. at 64. While retaining primary responsibility for assuring air quality within their boundaries, "the States were no longer given any choice as to whether they would meet this responsibility." Id.

The 1970 Amendments required the newly formed U.S. Environmental Protection Agency (EPA) within a matter of months to issue federal standards that "protect the public health" with "an adequate margin of safety." Pub. L. 91-604, § 4(a), 84 Stat. 1679-

¹⁹ American Association of State Highway and Transportation Officials, *Environmental Process Streamlining: A Report on Delays Associated with States' Categorical Exclusion and Environmental Assessment Processes*, Washington, DC, October 2000.

²⁰ Contact Janine Bauer for cite on case.

²¹ This section draws heavily from a memo by Howard Fox and David Barron, *The Campaign to Protect Public Health from Ground Level Ozone: A Third of A Century and Counting*, Earthjustice Legal Defense Fund, 2003, Washington, DC.

80 (Dec. 31, 1970) (Clean Air Act § 109). States were then required to submit pollution control plans, called State Implementation Plans (SIPs), to achieve the standards within three years -- and if they did not, EPA was directed to step in and promulgate federal plans. Pub. L. 91-604, § 4(a), 84 Stat. 1680-82 (Dec. 31, 1970) (Clean Air Act § 110).

EPA's initial national ambient air quality standard (NAAQS) for ozone was issued a year later. 36 Fed. Reg. 8187 (April 30, 1971). Although this NAAQS was nominally addressed to "photochemical oxidants," a group of pollutants that includes ozone among others, *id.*, compliance was gauged by measuring only ozone. American Petroleum Inst. v. Costle, 665 F.2d 1176, 1182 (D.C. Cir. 1981). Substantially more protective than the ozone NAAQS later issued in 1997, the 1971 NAAQS was violated if hourly average ozone levels exceeded 0.08 parts-per-million ("ppm") more than once per year. *Id.*

Efforts by EPA to establish controls on one of the biggest sources of pollution growth -- the sprawl development induced by new highways -- were overturned by the U.S. Congress in 1974, in response to pressures from the development industry and many local government officials, who continue to guard their power under U.S. law to control local zoning of land and development approvals, and typically generate a considerable share of their campaign contributions from the development industry. Deadlines for attaining the 1971 photochemical oxidants NAAQS expired in 1975, with many areas around the country still in violation. See 43 Fed. Reg. 8962-63 (March 3, 1978).

In 1977 Congress strengthened the Clean Air Act. In exchange for allowing extension of attainment deadlines until 1982, with a possible further extension until 1987, Congress required more aggressive anti-pollution programs -- including designation of areas violating standards as "nonattainment areas," and adoption of more protective pollution control requirements in those areas. Pub. L. 95-95, 91 Stat. 685 (Aug. 7, 1977). This law included a new provision requiring EPA to reevaluate and revise the NAAQS at least every five years. The authors of this provision noted their expectation that more protective NAAQS might well be required, given the direction in which scientific knowledge was developing. H. Rep. 294, 95th Cong., 1st Sess. 182 (1977).

In 1979, despite the expectations of the drafters of the 1977 Amendments, and over the protests of public health advocates, EPA weakened the 1971 0.08 ppm NAAQS, promulgating a one-hour ozone NAAQS at 0.12 ppm. 44 Fed. Reg. 8202 (February 8, 1979). Even with the weaker 1979 ozone standard, numerous areas around the country still failed to attain by the extended deadline established under the 1977 Amendments.

In 1985 and again in 1990 EPA missed the statutory five-year deadline for reviewing the ozone NAAQS and making appropriate revisions, but in the following year, as a component of its review of the ozone NAAQS, EPA completed a "criteria document" -- a compilation of scientific studies on ozone's health effects. Numerous areas failed to attain the 1979 ozone NAAQS even by the extended 1987 fallback deadline established by the 1977 Amendments.

EPA reviews of the failure of air quality control plans in the late 1980s pointed to the underestimation of motor vehicle emissions in these plans as a key aspect leading to their failure. In region after region, traffic growth induced by new road construction had been

underestimated while forecasts of the emission reduction benefits of new transportation technologies and cleaner fuels tended to be overly optimistic.

By the late 1980s, there was a growing recognition among political elites and experts that U.S. transportation policy was due for a tune-up. The first Bush Administration launched a new national transportation policy study in 1989, as the headlines were full of news of severe air pollution health problems choking American cities, the new challenge of global warming, the old, chronic, growing problem of traffic congestion which even the highway agencies were admitting they couldn't build their way out of, and the completion of the 150,000 mile Interstate Highway System. It was time for a new vision.

III. Federal Transportation Reform 1990-2000

A. 1990 Clean Air Act. In the wake of the failure of air quality control plans under the first 20 years of the federal Clean Air Act, Congress adopted a broad set of amendments to the Act in 1990 that established new deadlines, more stringent requirements for pollution cleanup, and a new strengthened transportation conformity provision that was designed to assure that transportation infrastructure spending and poor accounting for mobile source emissions would not continue to unwittingly undermine progress towards healthful air quality. Pub. L. 101-549, 104 Stat. 2399 (Nov. 15, 1990). Congress recognized that expansion of highways and resultant growth in traffic and pollution led to widespread, systematic underestimation of motor vehicle air pollution in state air pollution control plans between 1970 and 1990, causing those plans to fail.

The 1990 CAA requires SIPs to establish motor vehicle emission budgets, stationary source budgets (for powerplants and factories), and area source budgets (paints, agriculture), including control strategies limiting emissions from each. States can make trade-offs between control of various sources, encouraging exploration of the lowest cost means for timely attainment. The emissions budget is usually set at the maximum level of emissions that can be accommodated in the metropolitan airshed and still attain each NAAQS. The Act required interim SIPs to demonstrate reasonable further progress towards healthful air quality by reducing volatile organic compounds, a precursor of smog, by 3% a year, until the completion of new SIPs demonstrating how a region would attain the National Ambient Air Quality Standards (NAAQS), the levels of pollution concentration determined by EPA to be protective of public health.

Section 176(c) of the CAA requires that metropolitan planning organizations account for the emissions consequences that will result from planned future additions to the metropolitan transportation system. The conformity provision requires an emissions assessment to show that the planned system will not result in future emissions that will cause or contribute to new violations of NAAQSs, or interfere with timely attainment of applicable NAAQSs. This requirement applies to both the impact of cumulative changes in the transportation system on aggregate emissions of regional pollutants such as ozone, and also the impact on local air quality caused by direct emissions from facilities where vehicle emissions are concentrated (i.e., highway interchanges and truck/bus/rail

terminals). When vehicle emissions exceed the SIP's budget, new highway projects cannot be added to the regional system.²²

Under federal law prior to the 1990 Amendments to the Clean Air Act (CAA), most efforts to control motor vehicle emissions focused on requiring vehicle manufacturers to develop technological controls designed to reduce emissions at the source. These regulatory programs under the CAA focused almost exclusively on the adoption of tailpipe standards for three pollutants – carbon monoxide, nitrogen oxides (NOx) and volatile organic compounds (VOCs), and the reduction of lead in vehicle fuels.

Since enactment of the 1990 CAA Amendments, lead has been banned in on-road vehicle fuels (section 211(n)), and EPA has undertaken more comprehensive regulatory initiatives to reduce emissions from new light- and heavy-duty gasoline and diesel vehicles pursuant to section 202(a). Alternative-fuel fleets can be required by States in some ozone nonattainment areas (section 182(c)(4)), reformulated gasoline that reduces benzene emissions in addition to VOCs and NOx is required in severe ozone nonattainment areas (section 211(k)), and transportation agencies have been required to focus on the impact that future transportation system expansions will have on achieving the reductions in metropolitan-wide vehicle emissions needed to attain the NAAQS (section 176(c)). All of these initiatives, except reformulated gasoline, are expressly limited to emissions of the pollutants that contribute to ambient concentrations of the motor vehicle-related NAAQS pollutants (carbon monoxide, ozone, PM-10 and PM 2.5).

The 1990 CAA also added new authority in section 202(l) for EPA to regulate emissions of toxic pollutants emitted by motor vehicles that are associated with significant adverse health effects. In a 2001 rulemaking, EPA identified 21 of these pollutants as “mobile source air toxics” (MSATs), including six “priority” MSATs (benzene, 1,3 butadiene, formaldehyde, acetaldehyde, diesel organic gases and diesel particulate matter (DPM)).²³ EPA decided not to regulate emissions of these pollutants based on the finding that no feasible technological means are available to achieve additional emissions reductions beyond the reductions expected from compliance with current emissions limitations for NAAQS pollutants. EPA's MSAT rule could require the retrofit of existing diesel vehicles with available PM traps to achieve significant reductions in diesel PM and other MSATs without waiting for fleet replacement, but EPA later denied requests from nine states to exercise this authority.²⁴

B. 1991 ISTEA. The effective operation of the 1990 transportation conformity provisions would be dependent in part on transportation planning requirements that were up for reauthorization in 1991. Indeed, the Congress adopted sweeping transportation reforms that reshaped several decades of federal policy with the 1991 Intermodal Surface Transportation Efficiency Act (ISTEA).

²² Yuhnke, Robert E., "Federal Authorities Governing Strategies for Control of Emissions from Motor Vehicles," For the Workshop on Traffic, Health, and Infrastructure Planning, Johns Hopkins School of Public Health, February 1-3, 2004, p. 3.

²³ 66 Fed. Reg. 17229 (March 29, 2001).

²⁴ Yuhnke, Robert E., 2004. *op.cit.*

ISTEA transformed the funding and accountability framework for federal transportation policy. In proceeding decades U.S. community leaders would be penalized with a reduced funding match if they traded in 90% Interstate highway funding for 80% or less federal transit funding, in essence having to put up twice as much local funding or more to invest in public transportation vs. new Interstate roads, or even risking loss of all their federal transportation funds to another area with a "project ready to go." With ISTEA, every funding category was set with 80% federal funding share and 20% state and local funds, and almost all funds were made flexible as to their ultimate use, depending on community interest and needs. So-called "highway money" could now be flexed without penalty to build transit lines, sidewalks and bike paths, buy buses, or invest in improved planning.

Year by year, the 1991 ISTEA reforms brought more light and a wider array of interest groups than ever before to the discussion table for what in most places is an annual cycle of updating metropolitan and state transportation plans, programs, projects, and budgets. In many regions decisions were no longer being made solely by inaccessible highway bureaucrats and those who the biggest source of donations for local and state political campaigns - the road construction industry, truckers, and sprawl developers. Instead, advocates for transit, pedestrians, bicyclists, affordable housing, parks, and neighborhoods began to see they had a stake in the transportation decision making process with an opportunity to influence its outcome. The modest setaside of the Transportation Enhancements Program, which accounted for less than 3% of the total ISTEA funding, produced a protected source of funds for investments in bikepaths, sidewalks, noise walls along highways, revitalization of old railway stations and other transportation related historic assets, and other community enhancing amenities. The new ISTEA Congestion Mitigation Air Quality Program (CMAQ) created an even larger protected source of funding for investments in projects designed to reduce air pollution in areas designated as non-attainment under the CAA. And the new ISTEA Surface Transportation Program (STP) provided a greater opportunity for community leaders to redirect to local needs funds previously claimed by state DOTs as "highway dollars".

ISTEA represented a fundamental change in the framework for decision-making, with greater transparency and public involvement for planning and project programming, with greater access to data and information mandated by law. The composition of new metropolitan planning organizations (MPOs) was established by law, ensuring local governments a greater voice in decision-making about transportation planning and investments, rather than continuing a tight exclusionary relationship between federal highway bureaucrats and state DOTs, with no role or voice for local officials, as had existed for nearly a century in America.

ISTEA's new planning requirements brought to light advance information on exactly how much money would be available in the two-year planning horizon of a Transportation Improvement Program (TIP) and in the anticipated 20-year planning horizon of a Regional Transportation Plan (RTP), from what sources these funds are anticipated, how funds are proposed to be spent, and the impacts of this spending on air pollution, traffic congestion, and travel choices. ISTEA required public and local government involvement in the decision-making about these matters, which had to a large extent been business conducted behind closed doors in most states prior to 1991.

ISTEA's planning requirements fit closely with and helped provide a solid framework to implement the 1990 CAA conformity requirements. TIPs and RTPs were required to be "fiscally-constrained" and to conform to SIP motor vehicle emission budgets so that new transportation approval, acceptance, and funding decisions will not violate emission limits or delay timely air quality attainment. By requiring TIPs and RTPs to be fiscally constrained, Congress sought to assure that states and regions would not seek to demonstrate conformity by assuming a wish list of emission-reducing projects that could not realistically be built and operated on the schedule identified in the transportation program, a problem that had helped make ineffectual an earlier, weaker pre-1990 version of conformity. ISTEA required the update of RTPs every 3 years, and the update of TIPs every 2 years, with projects in the TIP to be drawn from and consistent with the RTP. This was consistent with the requirements in the CAA that EPA complete SIP compliance demonstrations every 3 years to ensure that the emission reduction measures assumed in the SIP were producing the expected result, and to ensure timely SIP revisions where necessary to correct SIP deficiencies. Only projects drawn from and consistent with the fiscally-constrained and conforming TIP can be approved by federal agencies or funded using federal funds. This helps reduce the chance that the planning and programming process will be turned into an opaque closed door resetting of spending priorities by state DOTs or other special interests, without adequate public or local government involvement or oversight.

C. Challenges to Implementation of CAA/ISTEA Reforms. The implementation of these new laws faced significant resistance from the highway lobby, state DOTs, and other interest groups with an established stake in the old way of doing business. EPA and U.S. DOT worked jointly to negotiate and issue regulations on conformity, while DOT retained sole control over issuing ISTEA planning rules. Time after time, environmental groups have had to file suit to compel executive agency action to issue overdue regulations required by the law and essential to implementation of the reforms, to compel agency enforcement of statutory CAA deadlines for submission of SIPs, and to act on scientific evidence that demanded reappraisal of the NAAQS.

The challenges to implementation of this performance-focused transportation planning process have been many. Repeatedly US DOT and EPA issued regulations that failed to comply with the statutes, leading environmental groups such as Environmental Defense, Sierra Club, the Natural Resources Defense Council, and Earthjustice Legal Defense Fund, to file litigation challenging the regulations. There have been ceaseless efforts by opponents of reform to weaken the law, regulations, and implementation of these process and governance reforms, with pressure intensifying especially after the 1994 election when control of the U.S. Congress shifted political parties, and again after the 2000 Presidential election result was decided by the U.S. Supreme Court. And at the state and regional level, there has been wide resistance to making technical improvement in transportation and emissions models that underlie performance-based governance approaches, often in fear that better analysis tools would make it harder for authorities to approve business-as-usual highway expansion proposals.

There were also significant political challenges in dealing with the pipeline of old transportation project proposals that had been promised future funding to satisfy various

local political interests. The new laws which required fiscally constrained plans made apparent the lack of funding to complete everything on the collective wish-list of expectations, forcing uncomfortable trade-offs to be acknowledged for the first time. The new laws made apparent the imprudence of many massive highway expansion proposals that would spur excessive traffic and pollution growth, knocking some of those projects out of newly fiscally constrained plans and into the long-range "vision plan" category of projects that might be built more than 20 years in the future. Transition rules from the old way of doing business to the new governance process proved troublesome.

For example, in 1991, EPA issued guidance on a new transitional conformity test invented by EPA attorneys which deemed that a TIP or RTP would be deemed to conform if it could demonstrate that its emissions were less than the emissions estimated for the metropolitan area in 1990 and if the TIP or RTP could show emissions less than the emissions produced by the previously adopted TIP or RTP. This so-called "build/no-build" test suffered from serious legal and technical flaws as framed by EPA. It did nothing to actually ensure that the transportation plan would contribute to timely attainment of the NAAQS. For example, a region could be experiencing growth in vehicle traffic of 6% a year under its previously adopted TIP, leading to emissions growth of 3% a year, but still pass this build/no-build conformity test so long as emissions remained below 1990 levels and emissions increases resulting from the new projects being added to the TIP were offset by other measures, such as new ridesharing or telework programs.

The flaws in this test were further exacerbated by the technical framework in which the build/no-build test was implemented by metropolitan planning organizations (MPOs). As applied in the early 1990s, it was commonly assumed as part of conformity analysis that building new highways would have no influence on travel behavior other than to change vehicle travel speeds and routes chosen by drivers between origins and destinations, with a few regional travel models accounting in part for changes in trip choice of trip destinations. No accounting was made for the way new highway capacity would influence land development patterns or the time-of-day of travel, two of the most profound impacts that scientific research shows occur as part of the effect commonly called "induced demand," a topic discussed further below.

EPA also issued regulations that allowed a 3-year transitional grandfather clause in the 1990 CAA to be turned into an open-ended conformity approval for old projects even if they caused SIPs to fail by spurring excessive emissions. EPA ruled that if a project was once part of a conforming TIP and RTP, it would be deemed to continue to conform as long as the project design did not change significantly and there was some progress to advance it every three years. This and several other problematic regulatory provisions were challenged successfully in a federal suit that was won by the environmental plaintiffs in 1998, which helped redirect to public transportation and highway safety projects over \$0.300 billion in road funds in metropolitan Atlanta for projects that had been illegally advanced on the basis of the overturned regulatory provisions (see box).

D. The Challenge of Improving Travel and Emissions Models. One of the major causes of the failure of ozone SIPs to produce attainment during the 1980s was the systematic failure of the transportation models to account for the very significant increase

in motor vehicle emissions that resulted from induced travel demand caused by new highway construction. Various Transportation Research Board (TRB) studies have indicated that about 25% of total growth in vehicle travel in metropolitan areas is attributable to induced demand. The failure to account for that magnitude of motor vehicle emissions increases in the 1980s would have caused virtually all ozone SIPs to fail. Indeed, almost all metropolitan areas failed to attain even when they implemented SIPs EPA thought were adequate for attainment. The need for Congress in 1990 to enact an entire new program for ozone control in America's urban areas can be attributed, in significant part, to the deficiencies in the transportation models that failed to account for traffic growth trends of the preceding two decades.

A number of scientific studies in recent years have documented the common sense adage, "If you build it they will come," that building more roads generates more traffic, often to a degree that the increased highway capacity does little or nothing in the longer run to abate congestion. A recent paper summarizing the literature shows that for every 10 percent increase in road lane miles, it is typical to find a 3 to 11 percent increase in vehicle miles traveled, with 8 percent being a typical median value.²⁵

Yet typical computer traffic models used by MPOs in 1990 were simple highway engineering models ill suited for public policy or environmental analysis. Many of these tools were estimated on old data, insensitive to induced traffic and land use changes caused by changes in transportation system capacity and user costs, and unable to represent walking, bicycling, public transportation, or travel choices other than driving. The most serious consequence of large errors in these transportation and emission models is the failure to reduce motor vehicle emissions enough to meet the NAAQS, due to underestimation of traffic growth, or overestimation of the emission reductions likely from policies adopted in SIPs or under federal emission reduction programs, such as advanced inspection and maintenance of motor vehicles.

²⁵ Robert Noland and Lewison Lem, "A review of induced travel and changes in transportation and environmental policy in the US and the UK," *Transportation Research Part D*, Vol. 7, 2002.

Transportation Conformity at Work in Atlanta – Page 1

Most U.S. metro areas have managed their transportation plans to comply with their SIPs. When these have come into conflict, resulting in conformity lapses, these have been brief, mostly resolved a few months or less after working out administrative problems or by adding new emission-reducing transportation projects to TIPs and RTPs to offset excess pollution.

In several instances, most notably in metropolitan Atlanta, conformity lapses have persisted longer, due to ongoing interagency conflict and resistance from transportation and development interests. In the 1970s and '80s Georgia DOT invested heavily in freeway expansions, spurring massive low-density car-dependent sprawl development. By the mid-1990s, Atlanta residents drove 56 km per day per person, more than in any other metro area in the world, exacting a high price in air quality. The ozone NAAQS has been exceeded each year in Atlanta since 1980 and continues to be violated many days each year. In 1999, when Atlanta was required by the Clean Air Act to attain healthful air quality, the region had the highest number of unhealthy days in the decade, with 22 days above the 1-hour health standard for ozone air pollution. With new pollution controls being made in recent years on power plants, mobile sources, including on-and off-road, will be responsible for about 83 percent of the Atlanta area's ozone problem.

Routine conformity analysis of the TIP and RTP has been vital to making progress on clean air in Atlanta. In 1996, the region's MPO submitted a SIP stating that the region would meet a motor vehicle emission budget of 214 tons per day (tpd) by 1999, when they were required to attain the ozone NAAQS. In 1998, the MPO wrote to EPA saying that its 1999 NOx emissions would actually be 238 tpd in 1999, reflecting the use of a refined travel model and updated growth forecasts. In 1999, the MPO found that real-time NOx emissions were 264 tpd. In 2001, the MPO admitted that it would not reach the 214 tpd motor vehicle NOx budget until 2005.

Conformity requirements led Atlanta officials to admit in September 1996 that its proposed TIP would exceed the June 1996 SIP emission budget. In response, the region deferred plans to add even more road expansions to the TIP and limited changes to the TIP to conformity-exempt projects. Proposals for more stringent vehicle inspection and maintenance programs, cleaner fuels, and better transit and emission reduction strategies proposed by local agencies and the regional transit agency were blocked by Georgia officials, though they could have solved the problem.

In 1997, just prior to the expiration of the TIP, Georgia DOT, with FHWA concurrence and opposition from EPA, sought to exempt nearly a billion dollars in highway capacity expansion projects from transportation conformity so they could continue building these sprawl, traffic, and pollution inducing new roads through what many expected to be a lengthy conformity lapse.

After the conformity lapse began in January 1998, the MPO adopted several interim TIPs and RTPs. In response to a suit filed by Environmental Defense, the DC Court of Appeals found invalid in March 1999 EPA conformity regulations that had been the basis for exempting over \$700 million in Atlanta area road projects from compliance with transportation conformity. As a result, the region lost no federal funds, but did end up shifting over \$300 million in spending during the conformity lapse from sprawl-inducing, pollution-boosting road projects to instead fund transit, sidewalks, bikepaths, HOV lanes, transit-oriented brownfields infill redevelopment, traffic signalization, intersection improvements, highway safety, bridge reconstruction, maintenance, and other conformity-exempt projects and Transportation Control Measures.

Transportation Conformity At Work in Atlanta – Page 2

Atlanta's conformity problems prompted intense engagement of business, civic, and community leaders to address the failures of their governance structures to agree on strategies to clean the air, manage sprawl, and provide the region's citizens with travel choices other than driving. It allowed Gov. Roy Barnes to get legislative approval in 1999 to create a potentially powerful Georgia Regional Transportation Authority (GRTA), with authority to fund transit expansions, review and approve transportation and development plans, and manage growth in non-attainment areas.

But soon after its creation, GRTA was pressed by Georgia officials to approve a new RTP that upported substantial road investment and sprawl, including outer beltways, in the early years of the plan and promised mostly unfunded major transit investments farther in the future. The MPO's analysis showed that the \$35 billion RTP would cause the share of regional employment reachable by those without cars to decline from 2000 to 2005 and not return to year 2000 levels until after 2015, raising serious questions about compliance of the federal approval of this plan with Title VI of the Civil Rights Act, which requires consideration of disparate impacts of federal spending on protected minorities.

Federal officials, environmental and civil rights groups questioned compliance of the RTP with fiscal constraint requirements; local officials questioned who would pay for expanded transit. The region's transit agency faced a severe fiscal crisis that led to a fare increase and major service cutbacks that harmed low-income minority transit riders. Georgia officials compounded this by accelerating road spending with new "innovative financing" bond issues, continuing to ignore festering transit financing issues.

Adding to these concerns, the Atlanta traffic model was found to seriously underestimate vehicle emissions due to misrepresented travel speeds on freeways. A later GRTA speed study affirmed these findings, but was suppressed until after approval of the conformity analysis that relied on the flawed model. This bad accounting for 12 tpd NO_x was simply disregarded by officials.

Following lengthy settlement negotiations that led to a tentative agreement in December 2000 for additional emission reductions, Georgia officials balked at making the agreement enforceable and withdrew from talks in January 2001. Once it was clear that Bush would be appointed President, the Governor restarted new road projects, prompting a new challenge to the RTP.

One of the key questions before the courts was whether the TIP must demonstrate conformity to the EPA-approved 1999 SIP motor vehicle emission budget at the time the TIP is approved and while the funds in the TIP were being spent. Georgia Governor Barnes and FHWA convinced the District Court that the Atlanta FY 2001-2003 TIP did not need to demonstrate conformity until 2004, despite the CAA statutory requirement for Atlanta to attain healthful air quality by 1999. A district court upheld this position. The 11th Circuit Court of Appeals approved the highway expansion without publishing its decision. If EPA concurs with FHWA's decision interpreting the CAA conformity provision and allows it to be applied broadly, the conformity requirement will not impose any enforceable limitation on regional motor vehicle emissions.

The ruling was dependent on a SIP revision that increased the motor vehicle emission budget to allow *greater* pollution, which was later invalidated by lawsuit. It was also dependent on an EPA attainment date extension policy that federal courts also later invalidated and EPA withdrew, forcing Atlanta to prepare a new SIP for a 2004 attainment deadline, but only after all the money in the 2001-2003 TIP had already been spent on new pollution increasing road projects.

To address this problem, following passage of the 1990 CAA amendments, the 1991 ISTEA law provided a 1.5% set-aside from several federal transportation funding categories to support MPO planning, data collection, modeling, and related activities required to implement the conformity and transportation planning process. Congress also authorized the use of Congestion Mitigation Air Quality (CMAQ) funds and other federal transportation funds to support such activities. In 1993, US DOT and EPA established a Federal Travel Model Improvement Program (TMIP) to help foster needed changes to MPO traffic models and EPA invested in further improvements to its MOBILE emissions factor models. TMIP has provided useful training to MPOs and documented and disseminated best practices in transportation and land use modeling, but has invested the bulk of its resources since 1995 in a multi-million dollar program based at Los Alamos National Lab to develop TRANSIMS, a supercomputer-based traffic simulation model that is still not fully operational for MPO use in 2004.

MPOs in non-attainment areas increased their spending to update their travel models and data collection throughout the 1990s in defensive response to EPA conformity regulations that established minimum modeling standards, but few MPOs flexed available federal transportation funds to support an expanded and accelerated data collection and planning effort sufficiently to advance their travel and emissions modeling capabilities to best practice standards. EPA's conformity regulations were "streamlined" in 1995, reducing the specificity of modeling requirements. FHWA in the mid-1990s issued weak, limited guidance on transportation modeling practices that failed to promote best practices and encouraged MPOs to be satisfied with adopting "standard practice" models instead. Interagency consultation established as part of transportation and air quality planning and every three-year MPO certification reviews have been the principal source of oversight of the adequacy and integrity of the transportation modeling process. While of value and productive of some improvement of MPO transportation modeling for conformity and SIP analysis, these measures have been grossly inadequate to effect timely MPO adoption of best practices or to challenge deeply entrenched standard deficient practices, such as the absence of time-of-day of travel sensitivity or validation of models, poor or no sensitivity to induced land use impacts of transportation investments, and incapacity to properly evaluate many transportation pricing strategies.

As a 1995 TRB report concluded: "The four-step process, as it is conventionally applied, will generally understate the amount of induced travel."²⁶ And most MPOs persist in conventional standard-practice application of "four-step" process traffic models in 2004, falling well short of best practices, meaning that most MPOs seriously underestimate induced traffic and related air pollution emissions. Unless addressed, this poses a major continuing threat to the success of SIP control strategies, which are likely to be inadequate to produce healthful air quality.

Most MPO travel models have limited capacity to represent the travel behavior effects of transit-oriented development, walkable neighborhoods, intelligent transportation systems, time-of-day road pricing, Bus Rapid Transit, and real-time-rideshare matching,

²⁶ Transportation Research Board, *Effects of Highway Capacity Increases on Energy and the Environment*, Special Report 245, Washington, DC, 1995.

Washington DC Metropolitan Planning Organization Travel Model: Independent Review by the Transportation Research Board Shows Need for Improvements

Environmental groups have long criticized many metropolitan transportation planning models for serious deficiencies in their capacity to fairly assess induced traffic, transit oriented development, and road pricing, accusing MPOs of using models biased in favor of highway system expansion and sprawl. Such charges in the metro Washington, DC region were leveled through two independent expert reviews of the official travel models commissioned by Environmental Defense in 2002, which followed over a decade of unsuccessful effort to pressure the MPO staff to improve policy-insensitive and poorly calibrated traffic models through the public involvement process and the agency's technical committees. These critical independent reviews prompted area elected officials to ask the Transportation Research Board to perform an independent review of the adequacy of the MPO traffic models. That review largely validated the previous outside criticism of environmental groups.

The 2003-04 critique of the Metropolitan Washington, DC regional travel models by the Transportation Research Board found that the model did a poor job of matching observed traffic counts, with an average simulation error of 23,000 vehicles per day on the freeway segments carrying over 100,000 vehicles per day.¹ Estimates of traffic in the morning and evening peak periods were even worse, with the model overestimating traffic leaving the DC core and the area inside the Capital Beltway in the PM peak hours by 21-27%, while underestimating traffic entering the area inside the Capital Beltway by 17% in the AM peak hours.² Such gross errors result in even larger mis-estimation of travel times, travel speeds, and induced travel impacts, making the resulting official estimates of emissions highly dubious and subject to easy manipulation with "just-in-time-model-fixes" whenever model produces findings that might get in the way of desired results.

Indeed, the TRB review found the Washington model used grossly inconsistent assumptions about the peaking of travel when estimating traffic emissions compared to the estimating traffic flows and travel behavior and relies too heavily on ad hoc adjustment factors which "undermines the fundamental behavioral logic of the four-step modeling process."³ Upon investigation, the MPO staff uncovered long-standing errors of 20 percent or more in their base year employment estimates, which are the foundation of travel demand modeling and affect all the model's outputs. These problems had been covered up by the extensive use of adjustment factors that directly affect the model's estimates of travel and traffic.

And recent investigation has found other problems. While FHWA guidance⁴ recommends using 50% of the prevailing wage rate as the value of time in economic analysis, the latest version of the Washington MPO travel model is grossly inconsistent internally, using 17% of the prevailing wage for mode choice analysis of work travel and 93% of the prevailing wage rate for assignment of single occupant vehicle trips, making it impossible to produce sound forecasts of traveler response to road tolls or changes in public transportation fares and biasing the model in favor of toll roads over transit.

¹ Letter from David J. Forkenbrock, Chair, Transportation Research Board's Committee for Review of Travel Demand Modeling by the Metropolitan Washington Council of Governments to Peter Shapiro, Chairman, National Capital region Transportation Planning Board, dated, September 3, 2003.

² Marshall, Norm, *A Citizen Guide to Critiques of the Metropolitan Washington Area Travel Model: What Does it All Mean?*, Environmental Defense, Washington, DC, June 15, 2004 citing Metropolitan Washington Transportation Planning Board handout *Version 2.1D Travel Model Validation*, May 21, 2004, TPB Travel Forecasting Subcommittee.

³ David J. Forkenbrock, *op.cit.*

⁴ Kruesi, Frank E, Assistant Secretary for Transportation Policy, U.S. Department of Transportation. Memorandum re "Departmental Guidance of Valuation of Travel Time in Economic Analyses", April 9, 1997.

or changes in parking policies and other commuter travel incentives. As a result, the environmental and energy benefits of these strategies are not reliably reflected in the outputs to the traffic models, nor are such strategies fairly considered in corridor-level environmental impact alternatives analysis or regional long range planning studies.

A recent GAO report noted that “the federal requirement to demonstrate that transportation plans and programs conform to an emissions budget serve as the primary incentive to assessing the emissions impacts of different land uses. Furthermore, such estimates [have] had some effect on transportation and land use decisions. For example, almost half of planners who reported conducting such estimates revised their transportation plans as a result, and about a third reported that local land use plans were revised...In the future more of the transportation and air quality officials may need to consider land use as a means to control emissions and improve air quality if EPA implements, as planned, two more stringent air quality standards. These officials face several barriers to further considering different land uses and their emission impacts, however, including a lack of required technical tools.”²⁷

This GAO report notes that, “DOT and EPA efforts to improve travel-demand-forecasting models may help MPOs and communities determine the effects of transportation improvements on congestion and air quality. However...these efforts currently do not call for integrating land use or environmental components into the travel demand model...Without such integrated models, communities cannot consider the likely effects that their transportation decisions will have on land use, future growth and development, and air quality.”²⁸

Some MPOs, such as Portland, Oregon, Columbus, Ohio, and Sacramento, California, have invested in data collection, analysis tools, and staff development, enabling them to demonstrate best practices in their applied analysis work. These best practices need to be more widely replicated. Portland’s models are now being adapted to improve statewide models used by Oregon DOT and used to advance a transportation planning process that is integrated with environmental resource and growth management. Such integration is the key to improving project delivery and the environmental stewardship of transportation agencies. Best practice transportation models have multiple ways of reflecting induced demand and land use impacts of transportation policies and investments and lead to better emission estimates.

E. Reauthorization of ISTEA as TEA-21. As ISTEA came up for reauthorization in 1997, a major battle ensued as the opponents of transportation reform in the state DOTs and road lobby tried to rescind the 1991 reforms. The federal gasoline tax of approximately \$0.04 per liter was generating over \$20 billion per year in revenue for the Highway Trust Fund, the key source of federal transportation assistance. Pro-highway, anti-transit conservatives were incensed that ISTEA had diverted a growing share of these funds for non-highway spending and they chafed under federal planning requirements that reduced the authority of the road and development lobby. Conservative devolution advocates suggested turning the federal highway and transit program into a

²⁷ U.S. General Accounting Office, *Environmental Protection: Federal Incentives Could Help Promote Land Use That Protects Air and Water Quality*, Washington, DC, October 2001, GAO-02-12, page 6.

²⁸ U.S. GAO-02-12, *op. cite*, page 95.

block grant to the states, to let states spend the money as they wished, without federal oversight or rules. But the biggest political muscle went into redirecting a lot of federal transportation funding from urban states like New York, New Jersey, California, and Massachusetts, which had enjoyed greater political power in the Democratic-controlled Congress in 1991, to instead favor states in the South and inter-mountain West, which enjoyed greater political power in the Republican controlled Congress in the mid-1990s.

There were strong efforts made to open up the CMAQ program for spending on general purpose highway lanes for congestion relief in non-attainment areas and to eliminate the Transportation Enhancements program were blocked after a hard campaign by road industry groups. Strong lobbying by the truckers and highway user groups like the American Automobile Association blocked combined efforts by transportation reformers and many transportation construction groups to broaden the authority for road pricing, which remained barred on the Interstate Highway System except under the authority of a small ISTEA congestion pricing pilot program.

Efforts to rollback environmental accountability laws including NEPA and the CAA as part of this reauthorization were thwarted by the threat of a veto by Democratic President Clinton. But anti-regulatory conservatives, road industry groups, and a bipartisan group in Congress mounted a strong push for "streamlining" environmental review procedures and circumventing any further gains by the ISTEA transportation reform coalition. The American Association of State Highway and Transportation Officials (AASHTO) and road construction and user groups pushed various proposals to delegate to the states federal authority and oversight for environmental reviews of transportation projects under NEPA and other laws, but these were blocked by effective negotiations by the environmental and transportation reform community.

In June 1998, Congress reauthorized ISTEA as the Transportation Equity Act for the 21st Century (TEA-21), largely reaffirming the 1991 reforms and funding structures but also laying in Section 1209 of the bill a foundation for continued pressure on US DOT and states to "streamline" the transportation environmental review and planning process.

F. Transportation Conformity Finally Reaches Full Operation in 2001. By fostering cooperation between transportation and air quality agencies over the past decade, conformity brought improvement in accounting for transportation air pollution in State Implementation Plans (SIPs) for air quality attainment and increased consideration of air quality as a factor in transportation decision-making, as intended by Congress.

- ? Since 1990, transportation conformity has increasingly ensured that state and local air quality planners account for the growth in vehicle driving activity and other sources of vehicular emissions, helping assure progress on clean air goals in the past decade.
- ? Conformity has assured that transportation agencies coordinate with state and regional environmental agencies through interagency consultation procedures to evaluate the emissions impacts of major transportation investments before funding decisions are final. Where conformity lapses have occurred because of problems in coordination, they have been generally of only a few months duration

and have led to improved local administration and governance to coordinate air quality, transportation, and growth management.

- ? Conformity has almost invisibly led to increased investments in cost-effective pollution-reducing transportation strategies that support more diverse travel choices, equitable access to jobs and public facilities, smarter growth, improved traffic safety, safer and more attractive opportunities for walking and bicycling. Conformity has expanded the base of political support for control strategies to reduce air pollution emissions through more stringent emission controls on vehicles, cleaner fuels, and more effective inspection and maintenance. Local and state transportation agencies and real estate development interests and the highway construction industry are motivated to support such strategies to avert transportation conformity constraints on highway construction funding.
- ? Conformity has fostered continuing improvement in transportation forecasting and emissions models used to appraise the implications of transportation and land use alternatives, providing a more sound basis for air quality and transportation plans.
- ? Conformity has enhanced the public's right-to-know about air quality and transportation impacts before decisions have been made.

These successes came about even though transportation conformity was only partially implemented in many regions until recently. Full implementation of the 1990 conformity amendment has always been dependent on the establishment of motor vehicle emissions budgets in attainment SIPs. Delays by the States in the development of air quality attainment plans for most of the nation's largest cities delayed the setting of emissions budgets to be met by metropolitan transportation systems, forcing reliance on earlier complex transition rules. The first motor vehicle budgets designed to attain the 1-hour ozone standard in most large cities were first submitted in 2000 in response to litigation enforcing Congress's deadlines for SIPs. EPA approved most of these SIPs only in 2001. Additional revisions to many of these SIPs were necessary to reflect updated motor vehicle emissions estimates using an updated version of EPA's Mobile computer model.

These new mobile source emission budgets took effect in 2000 as interim budgets while EPA continued to review the adequacy of the overall attainment plans for the more polluted metropolitan areas. These budgets provide a standard against which to measure the emissions produced by regional transportation plans. Metropolitan areas have 18 months from the submission of the interim budgets to revise their transportation plans to meet the new emissions targets for motor vehicles in each air shed. Thus, many cities adopting revisions to their transportation plans to meet the 1990 Act's conformity requirements only beginning in 2001, after a decade of delay.

For most of the 1990s, conformity in most regions relied on the weak, widely criticized, and often gamed 'build/no-build' test established by EPA as an interim stop-gap measure while States were developing the attainment plans with emissions budgets that are required by the CAA. The result was a system that required extensive modeling and planning, some upgrade to analysis methods, but in most cases produced little change in

transportation plans or investments beyond a few new ridesharing and transit projects. But with 1-hour ozone attainment motor vehicle emission budgets finally in place in non-attainment areas, conformity began to operate as intended.

Conformity remains critical to clean air progress because motor vehicles account for roughly half of all ozone precursor emissions in most large metropolitan areas. But even in those areas where the motor vehicle pollution share is less, such as Houston, where heavy industry accounts for a much larger contribution of pollution, steps to curb motor vehicle pollution are critical to attaining healthful air quality.

New, cleaner motor vehicle technologies mandated under the CAA Tier II motor vehicle emission standards will do a lot to clean up motor vehicle pollution over the next 15 years. But as NO_x emissions from large stationary sources (e.g., powerplants) are reduced under new EPA NO_x SIP requirements, the percentage contribution to ozone formation and fine particulates from motor vehicles will increase over the next decade even as total motor vehicle emissions are reduced. Much greater emission reductions will be needed to meet the 8-hour ozone and PM fine pollution standards in coming years. If motor vehicle emissions budgets are not complied with, metropolitan areas cannot attain and the CAA will again, for the third time in 30 years, fail to fulfill its promise of clean air for the American people.

The failure of transportation plans to comply with SIP budgets is the reason why most metropolitan areas failed to meet the ozone NAAQS in 1987. Many serious ozone non-attainment areas again failed to attain by 1999 (including Atlanta, Washington, DC, Baton Rouge, Dallas-Ft.Worth, Connecticut, Springfield) because motor vehicle emissions had not been reduced to the levels required for attainment.

IV. Counter-Revolution: Political Resurgence of the Highway Builders: 2001-2004

A. Transit Use Grows, Traffic Growth Slows, But the Tide Then Changes. The 1991 ISTEA reforms - reaffirmed and extended in the 1998 TEA-21 law – began to level the playing field between highways and other means of transportation after more than a half century of overwhelmingly pro-highway policies. Uneven local match requirements to get federal transportation funding, which once favored Interstate highway construction over transit and local street improvements, were leveled at an 80:20 federal - local match. The door opened for state and local governments in 15 states to begin exploring new transportation financing and management strategies, such as High Occupancy Toll (HOT) lanes and electronic time-of-day road pricing. Federal transportation funds were made more flexible to support transit, pedestrian safety, and market incentive programs, such as promoting employer-paid transit benefits. Accountability was expanded for states and regions to consider the short and long term effects of transportation decisions on air quality and transportation system performance.

Thanks in no small part to these reforms, the long rapid rise of vehicle kilometers of travel began to slow and more Americans began choosing alternatives to driving. From 1996-2002, transit ridership grew 19 percent, compared to an 11 percent increase in vehicle kilometers of travel. But the attack on September 11, 2001, and the changes it wrought in the U.S. political economy put a major obstacle in the road to further progress. Disastrous local and state finances caused by recession and rising homeland

security costs have prompted transit agencies to cutback service, increase fares, or both to compensate for funding shortfalls. By 2003, nine in ten large transit agencies had implemented or were planning to implement fare increases and one-third of all agencies were providing less frequent service.²⁹ Rising unemployment combined with fare increases and service cutbacks caused transit ridership to fall slightly in 2002, while vehicle kilometers driven rose 1.7% over 2001 levels as more Americans drove to avoid air travel for intercity trips.

The U.S. political climate grew sharply more polarized after the bitterly contested 2000 election, in which the wishes of the majority American voters who cast ballots were overruled by the opinion of the U.S. Supreme Court. Highway and industry groups got their best staff and friends appointed by the Bush Administration to run agencies across the federal government. The U.S. environmental community began to face its deepest isolation from power since the late 1960s. Flip-flops in control of the U.S. Senate brought a prolonged period of instability in Congress. The attacks of September 11, 2001, further fundamentally altered the balance of power and public attention in America, allowing right-wing conservative voices to stifle other voices and displaced environmental, civil rights, and social equity issues from the news media for many months. The Iraq crisis was used by the Bush Administration to further manipulate public opinion and the media, successfully dividing the Democratic Party and leading to further consolidation of the ascendant right-wing power bloc in the 2002 election.

Strongly anti-environmental officials had attained firm control of key committees in both houses of Congress, the Executive branch of the federal government, and for the most part, the federal judiciary as well. Indeed, the leadership of U.S. Congressional committees in charge of environmental and transportation matters, previously occupied by moderately liberal or centrist figures for decades, shifted to some of the most openly anti-environmental members of the U.S. Congress. It was in this climate that TEA-21, which expired in September 2003, advanced towards reauthorization.

B. "Streamlining" Transportation Planning and Environmental Reviews. Efforts to revise federal regulations governing transportation planning and project reviews during the Clinton Administration following passage of TEA-21 faced a substantial challenge in navigating between the hopes of two divergent groups. Environmental, transit, and civil rights groups had been campaigning for years for increased consideration of alternatives that could minimize or avoid adverse impacts on equity and the environment, more fully consider secondary, indirect, and cumulative impacts, and better involve the public, fulfilling the promise of NEPA, ISTEA, the Clean Water and Clean Air Act, Endangered Species Act, Section 4(f), and the Civil Rights Act of 1964. Many state transportation agencies and transportation industry groups on the other hand were pressing for a "streamlined" and more short-circuited review process carrying through on Section 1209 of TEA-21, which required a more coordinated review process. Many of these interests were intent on refighting the same battles they had lost during the ISTEA reauthorization for more concentration of power for transportation agencies in the process, with delegation of federal powers to the state transportation agencies, with more flexible and cursory reviews, with firm deadlines for completion of the process, limitations on judicial

²⁹ See: <http://www.apta.com/research/info/online/econimpactsurvey.cfm>

review of decisions, and a checklist approach to getting the job done, without opportunities for look-back or reconsideration.

Thanks to this conflict, and the intense partisan conflict between the U.S. Congress and the White House, the Clinton Administration's proposed transportation planning and project review regulations went through exhaustive development and efforts to define middle ground ended up in a muddle. The regulations faced a hostile reception from Congress and transportation industry groups and a lukewarm response from the environmental community. In the end, the proposed regulations got stuck in the transition and were eventually withdrawn by the Bush Administration in 2002.

The Clinton Administration had sensibly implemented Section 1209 of TEA-21 by documenting and encouraging use of best practices for better coordination of environmental reviews and planning, encouraging interagency agreements to improve efficient reviews and cooperation to address resource needs of environmental review agencies. The Bush Administration took a different tack starting in September 2002, announcing Presidential Executive Order 13274, with the stated purpose of encouraging a cooperative approach among federal and state officials and the public to expedite projects and promote “environmental stewardship.” State and local officials were invited to submit to the DOT Secretary nominations of projects that might be advanced through a streamlined environmental review process. More than 77 projects were nominated, and more than a dozen had advanced through the process as of June 2004. A just completed independent review of the process³⁰ found that while many aspects of Executive Order implementation have been responsibly handled, most fast-tracking has not adequately involved the public, considered alternatives, or reduced or avoided harm to communities and the environment. Advancing projects appears to have been a much higher priority than basic environmental stewardship.

Indeed, a federal district court judge on May 10th found that in approving one of the first four projects that completed a streamlined review process under the Executive Order - the Chittenden County Circumferential Highway near Burlington, Vermont - the Federal Highway Administration failed to adequately consider induced and cumulative impacts. Failure of federal and state transportation agencies to properly involve the public and consider impacts and alternatives has again become a key source of delay in winning agreement on mobility improvements that can be implemented successfully with broad support. The stated purpose of the Executive Order was to encourage a cooperative approach among federal and state officials and the public to expedite projects and promote environmental stewardship. Despite promising rhetoric, the U.S. Department of Transportation in many cases is seeking to constrain further consideration of alternatives or impacts to advance controversial projects.

Indeed, in August 2003, the FHWA issued new guidance pressing state DOTs to rescind cooperative agreements with resource agencies involved in the environmental review process unless those agreements required the resource agencies to defer to the transportation agencies on the determination of the purpose and need for the projects

³⁰ *Do Faster Federal Project Reviews Deliver Better Stewardship? An Analysis of Experience with Expedited Reviews Under Executive Order 13274*, Environmental Defense and NRDC, Washington, DC, May 2004.

undergoing review. The push was on by the road lobby to put transportation agencies firmly in charge of the entire transportation environmental review process.

C. Progress on Motor Vehicle Emission and Fuel Standards.³¹ In the closing months of the Clinton Administration, new more stringent tailpipe standards for light-duty vehicles were adopted, to take effect beginning with the 2004 model year, replacing the less stringent 1990 Tier I standards. These new Tier II standards are expected to achieve significant reductions in NO_x and VOC emissions over the next 12-15 years as older, dirtier vehicles are replaced by new vehicles meeting the new standards. More stringent tailpipe standards for heavy duty on-road vehicles and national sulfur-in-fuel standards were also adopted in 2002 and will take effect in 2007. These standards will require significant reductions in NO_x, VOC and PM emitted by both gasoline and diesel-fueled trucks and buses. Revision of the diesel standard was the object of much effort from some industry interests who wanted to weaken or delay it, but the Bush Administration reaffirmed the actions of the prior administration.

However, the rate of reductions in national emissions from these types of vehicles will depend heavily on the rate at which existing heavy-duty vehicles are replaced in service by new vehicles meeting the new standards. There is significant uncertainty regarding whether EPA's initial modeling analysis (1999), which assumed an average life of 300,000 miles for existing heavy-duty vehicles, is correct. More recent estimates suggest that engine replacement and other techniques may extend vehicle life to 800,000 miles. If vehicles currently in use are scrapped substantially later than EPA's original estimate, projected reductions in total fleet emissions may be delayed by a decade or more.

D. Limiting Emissions from Local Hot Spots. Recent health studies have accumulated in the past several years to critically demonstrate substantial adverse health impacts from mobile source air toxics, especially diesel exhaust, with frequently quite localized exposures and impacts. This has led to new work in considering how CAA conformity and NEPA might work together to foster design of more efficient transportation systems that better protect public health from both regional and local concentrations of hazardous air pollution and avoid or minimize other adverse impacts to the environment and communities.

EPA currently requires that "hot spot" analyses to assess the impact of vehicle emissions on air quality near a transportation facility only be performed for carbon monoxide and PM-10. In its 2003 draft rule to implement the PM 2.5 NAAQS, EPA has proposed to exempt transportation projects (e.g., major freeway expansions, new interchanges, diesel truck/bus depots or terminals) from any "hot spot" analysis for both PM 2.5 and PM-10 emissions.³² If finalized as proposed, transportation projects that emit PM sufficient to cause violations of either PM NAAQS would not be identified in most cases. Where NAAQS violations were predicted, the conformity requirement that mitigation measures sufficient to prevent NAAQS violations be adopted prior to project approval would not apply.³³

³¹ This section drawn from Yuhnke, *op.cit.* 2004. p.2.

³² 68 Fed. Reg. 62,689 (November 5, 2003).

³³ Yuhnke, 2004, *op.cit.*

EPA's rationale is that there is no evidence that emissions from transportation facilities cause violations of the PM 2.5 NAAQS. Research in this field is sparse, but a study cited by EPA in its Health Assessment Document for Diesel Engine Exhaust (May 2002) ("HAD") reported concentrations of PM 2.5 at a curb-side bus stop in Manhattan ranging from 13.0 to 46.7 µg/m³. Based on this study, EPA concluded: "The relevance of the Manhattan bus stop concentrations and potential exposure for large urban populations provide strong motivation for further studies in the vicinity of such hotspots." HAD, 2-99. A study of diesel PM at a transit bus garage conducted by the District of Columbia showed that local diesel vehicle traffic on 14th Street, a major urban arterial, contributed approximately 1.0 µg/m³, and that DPM emissions from the buses exiting and entering the bus garage contributed another 1 µg/m³ to the average (3 month) regional concentrations of DPM measured at residential locations more than 300m from the bus garage and at least one block away from 14th Street.³⁴ Virtually all DPM is less than 2.5 µm in diameter. Measurements of PM 2.5 adjacent to major highways in the Netherlands indicate that concentrations range from 4 to 8 µg/m³ higher at monitors located next to the highway compared to monitors 500m from the roadway. These data suggest that performing conformity assessments for heavily trafficked freeways and other major sources of diesel vehicle emissions will likely result in requiring mitigation measures that provide significant protection from violations of the NAAQS for PM 2.5.³⁵

E. One Step Forward, Two Steps Back on New National Clean Air Standards.³⁶

For decades, the U.S. public health community had put forward overwhelming scientific evidence demonstrating that the weaker 1-hour ozone standard adopted in 1979 was insufficiently protective of public health and that EPA needed to adopt a more protective standard under the authority of the CAA.

Congress noted in the 1990 CAA the harmful effects of ozone on the respiratory system, and stated: "New evidence is ... accumulating that the current ozone standard may not be sufficiently protective of public health." S. Rep. 228, 101st Cong., 1st Sess. 6 (1989).

In 1991 the American Lung Association sued EPA over its failure to meet the 1985 and 1990 Clean Air Act deadlines for revising the 1979 ozone NAAQS, pointing to new science indicating adverse effects at levels allowed by that NAAQS. American Lung Association v. Reilly, E.D.N.Y. No. 91-CV-4114 JRB. But EPA disregarded these studies and the following year proposed not to change the NAAQS. 57 Fed. Reg. 35542 (Aug. 10, 1992), issuing a final decision in 1993. 58 Fed. Reg. 13008 (March 9, 1993).

EPA's decision noted that the Clean Air Scientific Advisory Committee, a committee of scientists statutorily assigned by Congress with the responsibility to advise EPA concerning NAAQS and criteria, advised EPA that many of its members believed the 1979 ozone NAAQS provided "little or no margin of safety," and some of them favored strengthening the NAAQS to 0.10 ppm or lower. 58 Fed. Reg. 13018. Moreover, CASAC noted:

³⁴ The Impact of the Northern Bus Garage on Local Air Quality, A Report to the Washington Metropolitan Area Transit Authority (Versar, Inc., May 2003).

³⁵ Yuhnke, 2004, *op.cit.*

³⁶ This section on the history of the NAAQS revision from page 28-30 draws extensively from a 2003 memo by Fox and Barron, *op.cit.*

Of particular concern to CASAC is the potential for effects arising from exposures to ozone with daily peak concentrations at or near 0.12 ppm for periods of 6-8 hours and with co-exposure to other pollutants. This concern is due to air quality analyses which have shown that even in areas which do not repeatedly exceed the ozone standard, ozone concentrations can remain close to 0.12 ppm for several hours per day for extended periods of time in summer. There was concern based on recent controlled human exposure, epidemiology and toxicology studies, that such prolonged exposures could result in increased respiratory impairment.

In 1996 EPA published strong scientific evidence of adverse health effects from ozone at levels allowed by the 1979 NAAQS (EPA, Air Quality Criteria for Ozone and Related Photochemical Oxidants (July 1996), at 7-171) and proposed to issue a revised ozone NAAQS. 61 Fed. Reg. 65716 (December 13, 1996), which it issued the following year. The new NAAQS was set at an 0.08 ppm, eight-hour average (62 Fed. Reg. 38856 (July 18, 1997)). Although less protective than the original photochemical oxidants NAAQS promulgated by the Nixon Administration in 1971, this represented a step forward in public health protection. Soon after the 1997 ozone NAAQS was issued, dozens of industry plaintiffs and three States filed suit challenging it. American Lung Association and several other States opposed the challenges. The U.S. Congress set a July 18, 2000 deadline for EPA to make attainment status designations under the 1997 ozone NAAQS. Pub. L. 105-178, § 6103, 112 Stat. 465 (June 9, 1998).

The U.S. Court of Appeals for the D.C. Circuit, though rejecting most of industry's challenges, ruled that the 1997 ozone NAAQS violated a little-known constitutional theory known as the non-delegation doctrine. American Trucking Assns. v. USEPA, 175 F.3d 1027 (D.C. Cir. 1999), rehearing granted in part, denied in part, 195 F.3d 4 (D.C. Cir. 1999), rev'd in part, aff'd in part sub nom. Whitman v. American Trucking Assns., 531 U.S. 457 (2001). At the same time, the Court declined to vacate the NAAQS, and reaffirmed that EPA is "required" to make attainment status designations under the NAAQS. Id. at 1048, 1057.

In 2000 EPA, Massachusetts and New Jersey, and American Lung Association appealed the D.C. Circuit's constitutional ruling to the U.S. Supreme Court. In July of that year, the statutory deadline for making attainment status designations under the 1997 ozone NAAQS expired, without EPA having made such designations. In October, Congress enacted an appropriations rider barring use of funds for nonattainment designations until the Supreme Court's ruling, or June 15, 2001, whichever occurred first. Pub. L. 106-377, App. A, § 427, 114 Stat. 1441A-56 (Oct. 27, 2000).

The following year, in February 2001, the Supreme Court unanimously reversed the D.C. Circuit's constitutional ruling, and also unanimously rejected another industry argument by ruling that NAAQS must be based on public health, not compliance costs. The Court sent the case back to the D.C. Circuit to address any remaining unresolved claims. Whitman v. American Trucking Assns., 531 U.S. 457 (2001). On the issue of ozone implementation, the Court unanimously ruled that EPA's approach to implementing the 1997 ozone NAAQS was "astonishing," "unreasonable" and "unlawful." Specifically, EPA had shunted aside the detailed statutory anti-ozone protections enacted in 1990

("Subpart 2" of Part D of the Act), in favor of the weaker and less prescriptive generic Subpart 1 provisions. The Court sent the matter back to EPA to develop a lawful approach. 531 U.S. at 481-86. With the issuance of the Supreme Court's decision, the October 2000 appropriations rider expired. Nonetheless, EPA still did not make attainment status designations under the 1997 ozone NAAQS.

In March 2002, the D.C. Circuit rejected all remaining industry challenges to the 1997 ozone NAAQS, finding that -

[N]ot only is the record replete with references to studies demonstrating the inadequacies of the old one-hour standard, but EPA discussed at length the advantages of a longer averaging time, including reduced risk of prolonged exposures to unhealthy ozone levels and increased uniformity of protection across different urban areas. Moreover, EPA specifically cited [the Clean Air Scientific Advisory Committee]'s "consensus ... that an [eight]-hour standard [is] more appropriate for a human health-based standard than a [one]-hour standard" and its recommendation that "the present ... standard be eliminated and replaced with an [eight]-hour standard." Given this record evidence, our deferential standard of review, and the Clean Air Act's requirement that EPA must either follow CASAC's advice or explain why the proposed rule "differs ... from ... [CASAC's] recommendations," Petitioners cannot seriously expect us to second-guess EPA's conclusion regarding the inadequacy of the old, one-hour-average standard.

American Trucking Assns. v. USEPA, 283 F.3d 355, 378-79 (D.C. Cir. 2002)

Notwithstanding that ruling, EPA still failed to make attainment status designations under the 1997 NAAQS, prompting citizen groups to file suit to compel EPA to make the attainment status designations. American Lung Association v. Whitman, D.D.C. Civ. No. 02-2239 RMU.

In March 2003 the United States District Court for the District of Columbia signed a consent decree directing EPA make attainment status designations under the 1997 ozone NAAQS by April 15, 2004. American Lung Association v. Whitman, D.D.C. Civ. No. 02-2239 RMU. In June, EPA published a proposal addressing for implementation. 68 Fed. Reg. 32802 (June 2, 2003). Notwithstanding the Supreme Court's Whitman ruling, the proposal announced EPA's intention to largely jettison the extensive public health protections in the Clean Air Act's Subpart 2 in favor of the weaker Subpart 1 provisions, and to allow areas that have been polluted for decades to slacken their cleanup efforts. Complicating the public's ability to comment meaningfully was the agency's failure to include in the proposal any actual regulatory text. Instead, the proposal consisted exclusively of a narrative presentation of options.

Additional complications followed as a result of EPA's 2003 announcement of its intent to revoke the 1-hour ozone standard in April 2005, 12 months following the designation of new non-attainment areas under the 8-hour NAAQS. This was expressed in several proposed EPA rules in 2003, which were being finalized in spring 2004. This would negate adopted motor vehicle emissions budgets for 1-hour SIPs that are a foundation of

the transportation conformity process. This proposal would disable conformity for many years in the most polluted metropolitan areas like Philadelphia, Baltimore, New York, and Chicago, effectively removing most pollution controls from highway construction and transportation planning for many years. It could allow increases in allowable motor vehicle emissions of as much as one quarter to one-half by 2007 to 2010.³⁷

EPA proposed allowing states to ignore the motor vehicle emission budgets (MVEBs) in their 1-hour State Implementation Plans (SIPs) for future years, and to instead demonstrate conformity using any of several alternative tests. History shows that most states will succumb to pressure from highway interests to use whatever test is available to them that will allow the greatest expansion in highway emissions, and therefore is inevitably the least protective of public health. Among the conformity tests that EPA proposed to substitute is a "2002 baseline test" using motor vehicle emissions from 2002 as the level not to be exceeded. Application of this test in place of the adopted 1-hour motor vehicle emission budgets would allow motor vehicle emissions to increase after April 2005 to 2002 levels until new MVEBs are adopted for the 8-hr NAAQS. These new 8-hour budgets will not become available until 2007 at the earliest, and it is likely that 8-hour attainment SIPs will not actually be submitted and approved for several years after that for areas that are designated serious or severe under the 8-hr NAAQS. Under EPA's proposal, areas could approve new transportation plans so long as transportation emissions levels are less than 2002 levels. Since 2002 levels are well above the MVEBs established in the 1-hour SIP to achieve attainment, this could trigger approval of many pollution-inducing highway projects without any truly effective air pollution controls.

This revocation also would have the effect of allowing many highly polluted metro areas to miss their 2005 attainment deadline without consequence, with the standard remedies available under the 1990 CAA invalidated. There would be no requirement for the area that missed its attainment deadline to adopt additional pollution controls to ensure reasonable further progress in reduction of ozone precursors of 3% per year and no requirement for bump-up of the classification of the area to a more severe non-attainment status to trigger additional SIP requirements or emission controls.

In other words, in implementing a new more stringent air pollution standard that will not take full effect for many years, EPA is sharply relaxing its enforcement of existing air pollution standards and controls that protect public health.

This is all even further complicated by the announcement of a new voluntary approach to the Clean Air Act by the Bush Administration, called "Early Action Compacts," (EACs) which has no basis in law. Under this framework, areas that have previously been in attainment of the 1979 1-hour ozone standard that should by law be designated 8-hour ozone non-attainment areas under the 1997 NAAQS in April 2004 are being temporarily classified as "non-attainment status deferred" by EPA if local and state officials agree to take voluntary steps to reduce their air pollution to meet the 8-hour ozone standard by the

³⁷ Replegle, Michael, Dr. John Balbus, and Tracy Freuder, *Proposed EPA Conformity Rule Would Allow Increased Pollution from Highways, Threatening Public Health: A Review of Impacts in 12 Cities*, December 2003, Environmental Defense, Washington, DC.

2007 deadline for filing their 8-hour ozone SIP. If they fail to make timely progress towards this goal, EPA says it will remove the deferral of their non-attainment classification, imposing on them all the same obligations for air quality planning that are faced by other non-attainment areas. If they succeed, they will avoid non-attainment designation and the requirements of transportation conformity, New Source Review of stationary source emissions, and air quality SIP and maintenance planning. More than 70 areas had applied to be designated EAC areas by late 2003.

F. TEA-21 Reauthorization Advances Seeking Rollbacks of Key Environmental Laws. In March 2003, the Bush Administration proposed its TEA-21 reauthorization package, which featured high priority efforts to weaken Clean Air Act transportation conformity, Section 4(f) protections for parks, wildlife and waterfowl refuges, recreation areas, and historic resources, and to compromise the NEPA process. This was followed in June by leaked Senate committee proposals that would have entailed massive rollbacks of the Clean Air Act. In October, the Republican and Democratic leadership in the key Senate authorizing committee announced an agreement on a new transportation bill which all parties pledged to defend through the legislative process from strengthening or weakening amendments. The bill went even significantly further than the Administration in proposing to weaken the Clean Air Act, NEPA, and to strengthen the ability of federal and state highway agencies to override local decision authority. In a tightly controlled process, the Senate passed the bill in December 2003 while sharply limiting debate, amendments, and press coverage of the environmental rollbacks. Key Senators usually friendly to the environment threw their support behind the bill because this helped ensure more transportation funding for their states and because they feared an even worse bill might result from their open opposition, which might lead to Democrats being cut out of the legislative process completely.

Defying the usual pattern, the House of Representatives in March 2003 produced its own transportation bill that, with some exceptions, would do less harm to environmental protection laws than the Senate, while still resulting in some significant setbacks to long-standing environmental law. The two bills are now in conference committee, which is working out the differences. The biggest challenge to passage of the bill in 2004 is getting agreement among the Republican leadership over the price tag. President Bush has threatened to veto of any bill over \$256 billion over the coming 6 year authorization period. The Senate bill (S.1072) provides \$318 billion over 6 years. And the House bill (H.R.3550) provides \$275 billion, down from its original \$375 billion 6-year proposal. The TEA-21 authorization that expired in 2003 provided \$217 billion over 6 years.

Denver and Charlotte Extend Their Clean Air Horizon

Both the administration and Senate transportation bills propose that conformity should consider only the first 10 years of 20-year transportation plans, rather than long-term impacts of transportation. Yet the biggest impacts of new roads is the way they spur long-run sprawl and increased traffic. Their pollution impacts are felt most only after they fill to overcapacity with new traffic, usually more than 10 years into the future. In 6 metro regions in the past decade 20-year transportation plan emissions were found to exceed the air pollution plan limits under current law and in every single case, this problem was readily fixed by committing to future emissions controls or by redesigning the transportation plan to reduce emissions. In Charlotte in the mid-1990s, conformity showed excess emissions in the 20-year transportation plan. This led officials to adopt a revised plan with better transit and smarter growth, trimming forecast traffic growth and pollution by almost a quarter, winning voter approval for the plan. That's a conformity success story that might not be told today if only short-

Among the key issues in play are the following:

? The Senate bill would weaken the Clean Air Act in many ways, e.g., by reducing the frequency and scope of accounting for air pollution from highway projects, considering only the 10-year impacts of 20-year transportation plans and considering only the effects of large projects. The House bill makes this reduced horizon a local opt-in and does not exclude the vast majority of transportation projects from conformity, and unlike the Senate bill, ensures a continuing role for air agencies in substitution of Transportation Control Measures in SIPs

Washington D.C. Learns that Conformity Balance Can Help Keep the Doctor Away

Current law requires updating of conformity for areas with unhealthful air quality every 3 years for long-range transportation plans, matching the 3-year milestone compliance demonstration requirements by which EPA can ensure timely updates to air quality plans, and it requires conforming short-term transportation funding programs to be updated every 2 years. The Administration proposes to reduce this conformity frequency to only once every 5 years for both short and long term transportation plans and programs, while the Senate proposes every 4 years.

Like reducing the frequency of medical checkups for a person with a serious medical condition, or reducing the frequency of checkbook balancing for someone with a history of being overdrawn, reducing the frequency of conformity reduces the likelihood that problems will be detected and addressed in a timely way, when they are still manageable. Indeed, by a 3:1 margin, state air officials surveyed last year by the US General Accounting Office believed that reducing the frequency of conformity analysis to once every 5 years would make it more likely their area would fail to achieve healthful air quality by the deadlines established by the Clean Air Act.

For example, in metro Washington, DC, in 2001, a year into a two-year transportation program, regional officials updated planning assumptions to acknowledge the growing use of more highly polluting Sport Utility Vehicles (SUVs) by area drivers. They found this caused emissions to violate adopted air pollution plan limits by 8 tons per day. Over the next year, they found solutions within the transportation plan to this conformity problem with better accounting for emission strategies already underway, investing \$42 million in clean buses and other measures, and trimming \$800 million from road programs which cut forecast traffic growth, congestion, and pollution. If proposals for reduced conformity frequency had been law, the region would have ignored these problems for another two or three years without action. If proposals from the road lobby to mandate the use of out-of-date planning assumptions for conformity had been law, the DC area public and elected officials would not have even learned that their air pollution plan was failing due to rising use of SUVs. If other proposals from the road lobby to provide an 18-month grace period following a conformity lapse before limiting new project approvals had been law, solutions to the problem would have been deferred, not addressed. Air quality in our nation's capital would be more harmful on more days of the year. Attainment of healthful air quality would be a more distant goal. Thanks to current law, even while the DC area remains a severe non-attainment area for ozone, it's residents can breathe a bit easier.

- ? The Senate bill would weaken the National Environmental Policy Act, Clean Water Act, and Section 4(f) protections for parks, wildlife and waterfowl refuges, historic resources, and recreation areas:
- ✍ Putting federal highway agency bureaucrats in control of decisions about the project purpose and need and alternatives to be considered in environmental reviews, blocking environmental protection and resource agencies and the public from gaining consideration of alternatives that could avoid, minimize, or mitigate adverse impacts on health, air and water quality, and communities. The House bill does much less harm to these laws.
 - ✍ Allowing highway agencies to harm parks, wildlife and waterfowl refuges, and recreation areas, potentially without public notice and comment, in exchange for unenforceable and potentially unworkable mitigation agreements, through a *de minimis* exemption to Section 4(f). The House bill retains current protections for these resources.
- ? The Senate bill would allow federal highway bureaucrats to ignore locally-determined priorities and resource protection strategies in designing and evaluating major highway and transit projects. The Federal Highway Administration as the lead transportation agency would be able to disregard transportation plans developed by metropolitan planning organizations – local elected officials - and land use plans adopted by state or local governments or tribes, as well as environmental protection plans relating to air and water quality, habitat, endangered species. The House bill does not contain a comparable provision.
- ? The Senate bill would delegate the federal role in environmental review oversight to states in a new 5-state pilot program and wholesale delegate decisions to the states about what projects classify as categorical exclusions and therefore require no environmental review or public participation under NEPA. The House bill has a much more limited 5- state delegation pilot program for enhancements, Intelligent Transportation Systems, and recreational trails projects.
- ? The Senate bill would allow agencies to limit environmental review and public participation with regard "improvements" of any federal lands "recreational road," including any road providing access to any "lake, reservoir...public use area, or recreation or historic site," thus applying to several hundred thousand kilometers of roads in the National Forest System and national parks.
- ? The House bill would, however, impose a new 90-day limitation on judicial review for environmental analysis under NEPA and all federal law, including Clean Water Act, Endangered Species Act, Migratory Bird Act, without providing a guarantee that the public receives notice of the final decision or decision regarding whether to supplement or not and the starting of the clock for an appeal. The Senate bill contains no limitation on judicial review.

There are other positive elements in the Senate bill, including:

- ? Authorize funding for a new \$1 billion highway stormwater mitigation program.
- ? Provide transit and highways funding consistent with the recent funding proportions.

- ? Include increased funding set-asides for metropolitan planning organizations.
- ? Allow tolling existing Interstate highway lanes to pay for rehabilitation/reconstruction
- ? Allow tolling of new lanes on highways, permitting funds to be used for highways, transit capital and operating expenses, and impact mitigation, with performance goals, monitoring, and reporting requirements.
- ? Strengthen scenic byways, habitat mitigation, and invasive species, and planning capacity building initiatives.
- ? Create funding for a new transit in parks program.

And the House bill also includes several notable provisions that would:

- ? Authorize a new \$1.5 billion for a Safe Routes to Schools program, compared to only \$420 million authorized for this new pedestrian and bicycle safety program in the Senate bill.
- ? In the Committee approved bill provide \$3 million a year for non-toll market incentives to cut traffic and pollution, such as promotion and pilot projects exploring pay-as-you-drive insurance, car-sharing, and cash-in-lieu-of-parking options.

As of mid-June 2004, the prognosis for the transportation bill is uncertain, but it appears likely it could remain mired in intra-Republican party conflict over funding levels as Congress struggles to deal with a huge array of other unfinished business in a Presidential election year, as time runs out in the legislative calendar.

The past two major transportation bills, ISTEA and TEA-21, were passed by divided federal governments, with one party in the White House and the other major party controlling Congress. In both cases, broad-based "big-tent" coalitions of road and transportation industry groups, transit interests, environmental groups, local government interests, bicyclist associations, and others, came together to find common ground for more federal transportation investment within a flexible but accountable and increasingly transparent financial framework, breaking away from the closed-door decision-making of the preceding decades. The result in both cases was a big increase in federal transportation spending, with a big boost in public support for transportation investment in communities, and with greater assurance that the public would have a voice in the resulting program.

In the current reauthorization process, representatives of major road construction and highway user groups boasted in mid-2003 that they would move a new transportation bill themselves without the broad coalition that supported ISTEA and TEA-21, and would do so in a way that got rid of unnecessary environmental regulations, diversions of transportation funds to non-highway projects, and excessive public involvement that was an impediment to building more projects faster. It remains to be seen if they will succeed, or whether their unwillingness to work cooperatively may mean less federal investment in transportation and more conflict and litigation that delays or stops poorly conceived and badly designed transportation initiatives that fail to create lasting public support.

V. Designing Efficient Transportation Systems That Protect Public Health and the Environment

In the current political environment, a key challenge for environmental progress is finding strategies that help align market forces with pollution reduction or pollution prevention, that align cost savings with environmental efficiency. In the transportation sphere, once such strategy may be more widespread automated road pricing, with prudent use of revenues and sound accountability for performance.

With some automobile manufacturers beginning to offer more fuel efficient vehicle options for motorists, such as higher efficiency hybrid vehicles, the traditionally biggest U.S. transportation financing source, the fixed "cents-per-gallon" gasoline tax, is being seen by key transportation leaders as a threatened revenue stream. The Republican Party's strong anti-tax stance in recent decades has made it very difficult for Congress and the states to raise or even index gasoline taxes to the cost of fuel. And there has been growing support for considering how increased private sector investment in transportation might be mobilized to complement increasingly stretched thin public finances, which are now teetering due to the Bush Administration's massive tax cuts for the wealthy, the cost of the U.S. war in Iraq and globally unprecedented levels of military spending, new homeland security expenditures, and growing entitlement programs for retirement and health care. This is giving rise to new bipartisan consideration to transportation market incentive strategies in the U.S. Congress, especially road pricing.

The technology for electronic non-stop, high-speed toll collection on highways has finally arrived. ISTEA and TEA-21 authorized limited pilot testing of market incentive strategies under what has been called the congestion pricing or value pricing program. Through this initiative, a number of successful time-of-day road pricing initiatives have advanced, as well as promising experiments with cash-in-lieu-of-parking incentives, pay-as-you-drive car insurance, and carsharing.

Congestion pricing and road tolls, mileage or emission based registration fees, distance-driven-based-fees, Pay-As-You-Drive (PAYD) auto insurance or other use-based auto insurance, and gasoline tax increases could all produce significant revenues as well as traffic and pollution reduction. Expert analysis of likely impacts of such strategies in many other metropolitan areas have found substantial traffic and corresponding emission reductions possible as a result of any one of these strategies.

A study by the California Air Resources Board found that congestion pricing at \$0.19 a mile would yield a NO_x reduction of 3.6% in the South Coast region of California while a \$0.50/gallon fuel increase would yield NO_x reductions of 3-4%. A \$.02/mile distance-based fee would reduce NO_x emissions by 4% in various California metro areas. Combining congestion pricing of \$0.09/mile in peak, a \$1 a day employee parking

Pay-As-You-Drive Insurance: Cutting Traffic By 10% With Consumer Savings?

A recent study by the Federal Highway Administration showed that by converting fixed motorist costs of car insurance, taxes, and fees to variable costs that allow motorists to save money if they drive less, consumers would save billions of dollars a year and experience substantially less traffic delay. Studies suggest Pay-As-You-Drive (PAYD) car insurance could cut air pollution and traffic congestion by 10-12% or more.¹ Under current term-based insurance pricing, motorists who drive less than the average pay much higher costs per mile for car insurance than those who drive more than average, which encourages more driving and pollution. For example, for an intermediate size car, insurance premiums typically represent a cost even greater than fuel and oil costs, about one-fifth of the typical total financial costs of owning a car. When insurance premiums are converted to distance-based charges, motorists can save money by driving less and combining trips.

Newly available data indicate that distance-based insurance pricing is more actuarially accurate, and therefore more equitable and economically efficient than current pricing. Distance-based insurance provides specific benefits including reduced accidents, traffic congestion, and pollution, facility cost savings, insurance affordability, and increased consumer welfare. Vehicle travel foregone consists of low-value trips that consumers willingly give up in exchange for financial savings. Distance-based premiums would use “odometer audits” to provide accurate mileage data, which is estimated to have incremental costs averaging \$7.50 per vehicle year. Research suggests total benefits of distance-based insurance to be many times greater than costs, with a benefit:cost ratio of 50:1 estimated for the case of British Columbia. Motorists are expected to reduce their average mileage by about 10% under distance-based pricing, providing net savings to the vast majority of consumers. Even high mileage drivers experience virtually no increase in total vehicle costs if they reduce their mileage as predicted. Higher-mileage drivers would also benefit most from reduced traffic congestion, accident risk, and pollution.

The state of Texas enacted in May 2000 HB 45, which authorizes insurance companies to offer distance-based motor vehicle insurance policies. Oregon passed a bill in 2003 offering a \$100 state tax credit per policy for insurance companies offering distance-based insurance. US EPA and the Federal Highway Administration have in recent years cooperated in promoting use-based car insurance strategies, including PAYD insurance. FHWA’s Value Pricing program supported important research and pilot projects for use-based insurance in Georgia and Massachusetts, but the Bush Administration cut off funding for these in 2002.

Market incentives like PAYD insurance face significant state and local regulatory and institutional costs and barriers. Insurers express a strong desire for additional actuarial data to support PAYD policies. Government support is needed to foster public-private partnerships, share risks, collect and evaluate data, educate and inform consumers and service providers, and incubate and demonstrate alternative marketing, pricing, and business models. The U.S. Congress continues to consider reauthorization of the value pricing program in the TEA-21 reauthorization and a possible set-aside for PAYD incentives.

charge, a \$0.50/gallon fuel tax increase paid at the pump, and a mileage and emissions based fee of \$40-400/year, with current transit service, they found NOx emissions reduced by 10-12% in San Francisco, Sacramento, San Diego, and Los Angeles.³⁸ Combining the same congestion pricing with a \$3/day employee parking charge, a \$2/gallon gas increase paid at the pump, and mileage and emission fees of \$10-1000/year, with extensive transit investment would cut NOx emissions in these cities by 32-35%.

A promising option for unclogging roads, especially in more congested metropolitan areas, is automated time-of-day tolls and High Occupancy Toll (HOT) lanes, which allow solo drivers to pay to use High Occupancy Vehicle (HOV) lanes, while giving a free ride to buses, vans, and sometimes carpools. These can put to work unused capacity in HOV lanes and low efficiency general purpose lanes, helping to pay for expanded transportation choices. A network of HOT lanes on existing highways is likely to provide more effective congestion relief than building new roads, especially if revenues are used to expand travel choices for all. But new outer beltway roads – even if built as toll roads - are likely to exacerbate sprawl and put more jobs out of reach for those without cars, hurting the poor and the environment. Wise policy will avoid the latter, instead giving time-stressed travelers a way to buy relief from growing congestion delays in existing freeway and travel corridors.

New non-stop electronic toll technology means motorists don't need to slow down to pay tolls. And HOT lane fees -- higher in rush hour and discounted at other times – can keep traffic flowing without wasting scarce road capacity like some HOV lanes do. This makes it possible to contemplate future conversion of some existing general-purpose lanes to HOT lanes, particularly where new capacity is being added to existing roads.

HOT lane experience indicates this strategy can garner popular support. In the most recent survey of the I-15 Express Lane corridor in San Diego, 91% of I-15 commuters agreed with the statement, “it’s a good idea to have a time saving option on the I-15 always available.”

On California's Route 91, diversion of traffic onto HOT lanes has reduced congestion on the entire road and increased the number of passengers per car to 1.6, compared to the average of 1.2. Similar road toll related incentives have been implemented or are being considered in Texas, Florida, Colorado, Georgia, New Jersey, New York, and other states.

The Port Authority of NY-NJ in March 2001 introduced time-of-day tolls on Hudson River bridges and tunnels and Staten Island bridges, giving discounts for electronic toll payers who avoid rush hours and charging a premium in the time of most concentrated demand, just like movie theaters and many other services. This helps reduce congestion by shifting the time of day of traffic. Regional agency officials have estimated the Port Authority’s modest time-of-day toll system has cut traffic in the peak hours by 7%. Toll revenues support better PATH rail transit and regional transportation infrastructure and

³⁸ California Air Resources Board, *Transportation Pricing Strategies for California: An Assessment of Congestion, Emissions, Energy, and Equity Impacts*, November 1996, Sacramento, CA.

services. The NJ Turnpike, NY Thruway Authority, and other tolling agencies have implemented time-of-day tolls to manage traffic.

HOT lanes in existing road corridors – if developed appropriately - can expand both travel choices and equity, but if revenues are dedicated solely to road construction, these benefits can disappear. HOT lane critics often unfairly bash them as "Lexus Lanes," serving only the rich. Several real-world HOT lanes look more like "Lumina Lanes," used by people of widely varying incomes who occasionally need to bypass traffic delays that disrupt their social, family, or work life. A working class mom who is facing a \$1 a minute penalty for picking her kids up late at day care is happy to pay \$4 to save 20 minutes by using the HOT lane on those several days a month when she needs it. The typical users of California HOT lanes spend less than \$20 a month on HOT tolls, using them on days they are in a real rush.

The real issue is *what happens to the toll revenue?* If HOT lane revenues fund new transit, as on San Diego's I-15 HOT lane, everyone wins. Lower income transit users and carpoolers can get access to otherwise inaccessible suburban jobs. Drivers benefit from reduced road congestion and better services and choices. If a portion of HOT lane revenues help pay for the road, then those who drive most are paying more of their fair share, helping all taxpayers win, since road user fees don't cover the cost of building and operating America's roads. And with new accounting rules forcing fuller disclosure of deferred maintenance, transportation providers need new sources of revenue to maintain systems, expand choices, and cope with growing travel demand.

But if HOT lane revenues, or other road tolls and motorist user fees are dedicated solely to building more highways, or if the tolls are dismantled once the bonds used to pay for the road capacity have been retired, then the net impact of this financing system is likely to be increased traffic, pollution, sprawl, and unequal access to opportunities and public facilities that hurt those without cars, especially people of low incomes, minorities, the disabled, the very young, and the very old. If HOT lanes and toll-supported road privatization and bond financing schemes are used to evade environmental and public accountability laws, these impacts are not likely to even be recognized until it is too late to do anything about it. The externality costs of imprudent investment choices will accrue to those least able to afford it, while the profits from road construction, sprawl development, and subsidized motor vehicle use accrue to a narrower set of private interests. The result would be an unlevel playing field for roads vs. transit, fostering imprudent stewardship of transportation resources, the environment, and communities.

The House transportation bill includes an amendment by Rep. Mark Kennedy that would eliminate the Value Pricing program and impose sharp limits on the flexibility of states to put tolls on Interstate highways, even more so than today. Although it would allow the use of tolls on the Interstate System to finance the construction and subsequent improvement of designated "FAST" (Freeing Alternatives for Speedy Transportation) toll lanes, it would require tolls to be eliminated when costs have been recouped, eliminating the opportunity to use tolls to better manage traffic, as well as prohibit the use of toll revenues to support public transportation or anything other than paying off the bonds to build the new lanes. This approach is favored by the truckers and highway user groups and some right-wing anti-tax conservatives.

The Senate transportation bill includes language that would give states much greater flexibility to impose tolls on Interstate highways and to use toll revenues for transportation purposes, with requirements for establishing goals for each tolling project with public involvement that consider use of alternative modes, distribution of project benefits and burdens, and use of revenues to support public transportation. It would require monitoring of project performance and periodic public reporting, and would also reauthorize a pilot program to fund pre-implementation outreach and studies and post-implementation monitoring of projects. This approach is favored by a diverse coalition of road builders, state DOTs, transit agencies, environmental groups, metropolitan planning organizations, mayors of cities, and transportation reform groups.

The House bill language would facilitate rapid expansion of sprawl, traffic, and pollution-increasing highways, exacerbating inequity of access to jobs and public facilities for people without cars and benefiting higher income travelers while discriminating against low-income people. The Senate bill language could lead to the same outcome in some places, but in other places might result in improved equity of access and net environmental benefits, where states design pricing projects to limit traffic growth and the need for new highway lanes, with revenues used at least in part to fund impact avoidance and mitigation strategies and to expand travel choices.

VI. Conclusions

Adapting lessons from the U.S. experience with transportation and air quality planning to other political and cultural contexts is fraught with risks. Governance and jurisprudence structures and forms and cultural expectations vary widely. Yet a few common experiences are surely widespread.

It is in many ways the easiest part to write legislation. The hardest part is to win its implementation. The challenges of comprehending and shaping organizational cultures are huge, and these tend to change but slowly. It is helpful to find compelling stories and tell them over and over. It is important to identify effective leaders and other individuals who can act effectively as change agents, who have the facility to make people comfortable with new approaches. Finding and documenting best practices and disseminating these as stories is an age old way of fostering innovation and social learning. Rewards, incentives, and sanctions all have their place in the panoply of tools with which to induce behavior change in people and their organizations. Opening up greater transparency, information disclosure, and opportunities for involvement of stakeholders can be a potent means of empowerment for reform, in transportation and environmental management systems and other spheres. Enabling people to shape a vision out of their own experience of working together can also be transformative. All too often in transportation, only a few get to play with the visions, yet experience shows great wisdom in involving more people in that enterprise with regard to their own community. And when transportation agencies listen respectfully to community stakeholders and attend to their meaning, there are opportunities for cooperative learning, problem-solving, and cultivation of trust. Top-down "decide-announce-defend" or "DAD" style transportation governance is a good way to get people angry and feeling disrespected.

The U.S. experience with transportation and air quality is very much unfinished business, messy, inconsistent, and frequently filled with maddening contradictions that ensure far from effective progress, and frequently recurring failure. Yet progress has been made, and others have at times found the model to have its appeal. Take from it what you will.

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