

High Performance Corridors: Emerging Transportation Management Framework?

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Abstract

U.S. transportation authorities are expanding toll roads and use of public-private partnerships (PPPs) to finance transportation. What are the implications for traffic growth, sprawl, and pollution? What do recent deals portend for public involvement, governance, and information access about transportation system performance? What is the likelihood that these deals will address the public priorities and needs, with transparency and oversight of performance and use of funds? Will those putting PPP contracts together be focused on how different contract structures might affect the behavior of public and private sector actors and the performance of the transportation system? This paper explores these issues by examining several recent and proposed toll road PPP concession agreements, laws, and debates.

The paper suggests that depending on the terms of the agreements and how funds are used, these investments could lead to a significant growth in traffic, sprawl, air and water pollution, and inequality of access to jobs and public facilities. This is particularly a risk if these projects proceed with little consideration of alternatives and only cursory review of indirect, secondary, and cumulative impacts on the environment and public health. However, if PPP projects were to adapt and extend what may be emerging best practices in PPP contracting and project development, these deals might be transformed into a new model – the High Performance Corridor. Recent experience with community benefit agreements and standard setting for other transportation projects in California offer useful lessons.

The paper suggests ways to broaden support for PPP road investments with contractual obligations to respect communities and the environment through enforceable performance agreements, use of concession fees and toll revenues for investments in better transit and the mitigation and remediation of adverse transportation impacts, and reducing the share of tolls used to build bigger or new roads. Such an approach could help implement the 2005 U.S. transportation law, which for the first time requires state and regional transportation plans to achieve the objectives of the federally mandated planning process - to improve mobility and safety while minimizing fuel use and air pollution emissions.

The paper discusses and extends an alternative concession agreement approach, drawing on recent work by Federal Highway Administration official Pat DeCorla-Souza. That work suggests an “Operate-Design-Build-Operate model” that focuses first on operating the existing highway corridor with such strategies as improved transit and vanpool services, rush hour shoulder lanes, ramp-metering, and peak-period congestion charges. Investment in new capacity follows only after first implementing cost-effective operational improvements. Peak period tolls set to manage congestion might not be retained by the concessionaire, but managed publicly. Concessionaire income might be based on “shadow tolls” based on the number of people and amount of goods moved in the corridor without congestion and meeting environmental requirements.

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I. Introduction

Across America and beyond, private investment in roads is soaring, fueled by multiple converging trends. Global investors awash in cash are looking for long-term investment alternatives. Many fiscally strained governments are turning to the private sector to unlock value trapped in often poorly operated publicly-owned transportation assets. The fiscal distress of many state and local governments is likely to grow sharply in 2006 as new Government Accounting Standards spotlight seriously under-funded pension and retiree health plan obligations and compel better infrastructure asset management accounting. For the first time, the 2005 federal transportation law, SAFETEA-LU, authorized use of up to \$15 billion in private activity bonds for roads, while expanding opportunities for states to toll on new and existing highways. The U.S. executive branch continues to be resistant to increasing taxes or borrowing for transportation and is strongly encouraging states to address their transportation investment and management needs using more toll revenue.

Regions struggling with traffic congestion and funding shortfalls are seeking improved asset management and system performance tools. New technologies make automated non-stop road pricing a practical matter, unlike past days when tolls meant getting stuck in backups waiting to throw your money out the window. Metropolitan planning organizations and states across America, from Miami to Seattle, San Diego to New York, are beginning to move road tolls and innovative financing tools into the mainstream of their planning and program implementation efforts, spurred by growing private sector initiatives to invest in transportation infrastructure. New federal planning requirements seem likely to spur this on. (Replogle, 2006)

Will these new ways of financing and managing transportation systems be used to deliver just more and bigger toll roads, with more traffic, sprawl, and pollution? Or high performance corridors that focus on boosting travel choices, cutting congestion, and improving environmental quality with better management, operation, and enhancement of existing transportation assets, adding new capacity only when it is most cost-effective? Will the planning and project review process consider alternatives that support improved mobility and economic development while minimizing fuel use, emissions, and environmental harm? Will the public and local officials have a seat at the table as goals and agreements for transportation public-private partnership concession agreements are negotiated? Will the resulting systems address the public's priorities and needs, with appropriate transparency and oversight of performance and use of funds? How will the structure of concession agreements influence these outcomes?

Some regions are using tolls to expand travel choices, others focusing more on just expanding highways. San Diego's toll managed lanes on I-15 save time for many and help pay for new express bus service, and have garnered 80% public approval, spurring plans for a regional transit-supportive toll lane network. Houston has similar plans moving forward in the Katy Freeway and other corridors. However, neither San Diego nor Houston have framed these initiatives around strong efforts to ensure transit-supportive land use with pedestrian and bicycle friendly transit node development near the system's key access points; these systems are likely to remain mostly reliant on automobile park-and-ride access.

Toll managed lanes are now part of metropolitan Washington, DC's long-range plan, with half a dozen toll lane proposals advancing and a regional study underway for a large network of variably priced lanes. But in that region as well, public and interagency debates in the regional and state planning process make it clear that so far the transit planning and transit system integration elements of these projects are in slow motion, while efforts to advance additional toll-financed roadway capacity move forward quickly in multiple corridors.

In many states public officials are also looking at how to use Public-Private Partnerships (PPPs) to unlock value trapped in underperforming existing public infrastructure. A \$1.8 billion 99-year lease of the Chicago Skyway toll road in 2004 paid off debts, bolstered the City of Chicago's budget for years to come, and funded programs for the elderly, children, and the poor, while allowing managed toll increases and ensuring long-term highway maintenance. In contrast, the just completed \$3.8 billion lease of the Indiana Toll Road in 2006 is being used to accelerate a \$10.3 billion state-wide road construction initiative. Texas, New Jersey, Delaware, Georgia, Pennsylvania, and others are also engaged in or exploring PPP toll concession deals.

Building new toll roads and lanes may provide short term congestion relief and spur more traffic growth but will not fix the roads already in place. Maryland DOT is proposing to add one toll managed lane in each direction on the Capital Beltway just north of Washington, DC, while upgrading an existing lane in each direction to a toll managed lane, rather than just adding new toll lanes. Some states like Oregon are looking to take their transportation asset management efforts beyond the pavement, integrating it with safety, traffic and transit operations, and system planning and management, including land use and natural resources.

The growing number of High Occupancy Toll (HOT) lanes, many created out of existing or planned HOV lanes, show ways to achieve higher productivity from roads. As Figure 1 shows, during times of greatest congestion, the toll managed lanes on California's SR 91 carry twice as many vehicles per hour per lane at three times the speed compared to parallel free unmanaged lanes. There may be opportunities in many corridors to upgrade unmanaged motorway lanes to high performance toll managed lanes on congested motorways. This data suggests that for every two lanes upgraded it would be like creating a new virtual lane of peak period motorway capacity, at a fraction of the cost.

But would the public accept introduction of tolls on existing jammed free motorways? Not if motorists see tolls as just another tax and remain stuck in traffic, without attractive dependable travel options. But experience with cordon charging in a half dozen cities across the world, from London to Norway and Stockholm, show public acceptance for pricing existing lanes if it delivers clearly visible congestion relief and better travel choices. In those regions, introduction of tolls on existing highways has funded better public transportation and traffic management, cutting traffic congestion delays typically by one-third, while sharply boosting the speed of the remaining motor vehicle and bus travel on the network. These initiatives have produced high performance networks. (Replogle and Funderburg, 2006)

What can we learn from experience to date? Are there new ways we might combine and extend best practices in tolling and PPPs to enhance the potential for more metropolitan areas to develop high performance corridors and networks?

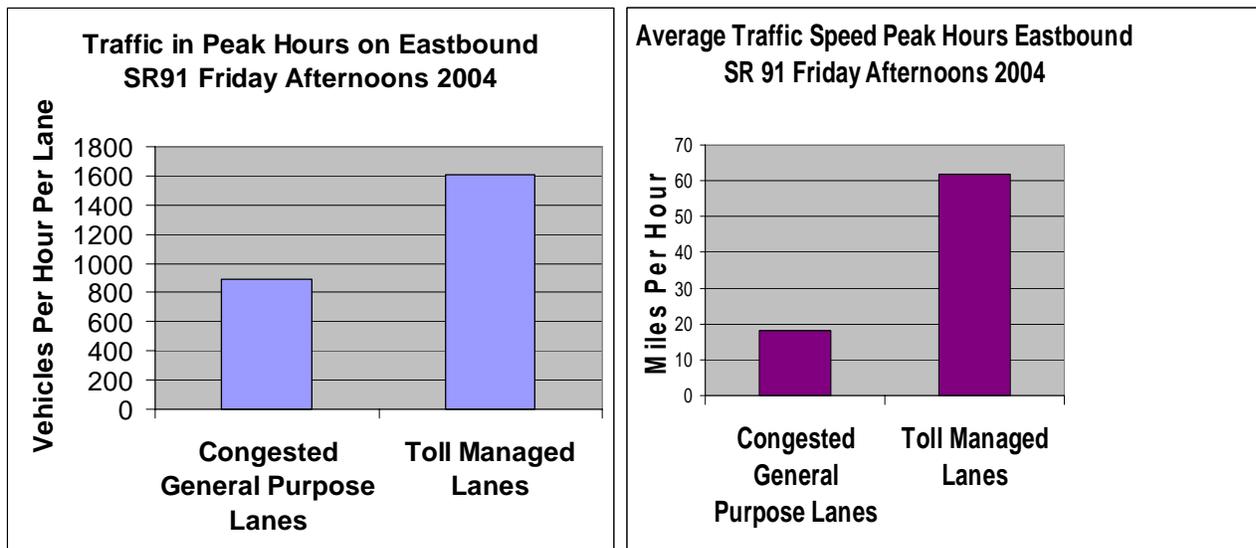


Figure 1: Upgrading existing free lanes to toll managed lanes could recover lost capacity with two toll managed lanes carrying as much traffic – at three times the speed – as moved in four free, but congested lanes (FHWA 2004)

II. Public-Private Partnerships: Aligned with Performance Objectives?

There are a wide array of activities and forms for Public-Private Partnerships (PPPs), ranging from works and service contracts, to management and maintenance contracts, operations and maintenance concessions, pre-development agreements, and build-operate-transfer concessions. Beyond this, greater private sector participation involves full privatization. PPPs may be used to directly or indirectly achieve a wide variety of public objectives, offering at times various advantages such as enhanced capacity to introduce new technologies, management strategies, and timely mobilization of private capital. But PPP concessions may also at times work against public welfare interests, harming labor, communities and the environment. (Sclar, 2000)

PPP mechanisms for compensating concessionaires come in a variety of forms. These include letting concessionaires keep whatever tolls are collected, or providing a shadow toll payment based on usage of the facility. Many European PPP infrastructure concessions in recent years provide concessionaires with availability payments based on the amount of time infrastructure is available for use while meeting service standards. Another option used in England is a congestion management payment based on both the amount and speed of traffic carried on each small segment of a highway by the hour. This is a variation of a performance payment or penalty framework. Yet other concessions rely in part, explicitly or implicitly, on revenues that may be derived from service areas, side-concessions, or value-capture related to real estate development opportunities. And concessions may include combinations of grants, user fees, and other revenue guarantees. Each of these may create hidden or explicit incentives for a PPP concession to serve or work against various system and public welfare objectives.

For example, basing payment to a concessionaire on actual tolls collected on a road provides an incentive to maximize traffic volume, while shifting the traffic risk to the concessionaire. In some cases, such an approach may raise profiteering issues with some members of the public. In

a quest to limit such concerns, some concession deals impose toll rate caps, which in turn may severely limit the ability of the concessionaire to use dynamic time-of-day tolling strategies to manage peak period congestion. When concessionaires are compensated based on actual toll revenue collected, concessionaires often seek to include non-compete agreements in contracts to restrict the ability of the public sector agencies to expand non-tolled highways or transit services that might compete with the facility managed by the concessionaire. Such a non-compete agreement was so objectionable in the SR-91 Riverside County corridor in southern California that the concession was terminated through a buy-out designed to remove the non-compete clause for the tolled facility to enable widening of parallel highway capacity.

Shadow tolls are typically based on traffic counts and the length of the roadway. These are often used on non-tolled facilities, transferring traffic forecast risk to concessionaire while encouraging higher traffic growth by avoiding user fees. For tolled facilities, use of a shadow toll PPP compensation approach may be used to insulate toll rate-setting from concerns about profiteering while enabling a concessionaire to employ dynamic time-of-day charging strategies to manage traffic congestion on the facility and maximize network productivity. Such a shadow tolling approach could be designed to reward a concessionaire for delivering greater mobility for more people and goods while reducing congestion and minimizing both emissions and fuel use.

Availability payment concession contracts rewards the contractor based on available facility lane-miles or lane-kilometers, taking into account the impact of maintenance closures, or the quality or quantity of other specified performance outputs. This approach is also often used on non-tolled facilities, encouraging effective facility maintenance while maximizing traffic growth. On tolled facilities, this approach could also insulate toll rate setting from concerns about profiteering. Such a payment approach could also be designed to reward minimized congestion, emissions and fuel use and maximized facility availability and reliability.

A congestion management payment approach has been used on a 54-kilometer stretch of the Darrington-to-Dishforth A1 Highway in Yorkshire, England to reward the concessionaire based on measured actual hourly traffic speeds and flows by 2 kilometer road segment, as shown in Figure 2. Payments are reduced when the average speed of traffic falls below the target average speed, giving an incentive to the concessionaire to manage any congestion causing event in the corridor. An allowance is made to lessen the impact of the reduction penalty as flow approaches the established road capacity, reducing the risks associated with congestion due to lack of capacity. If traffic flow exceeds the rated capacity, the concessionaire receives a bonus for traffic traveling above a minimum speed under high flow conditions. This provides an incentive for the concessionaire to actively manage and bring forward proposals to keep traffic flowing freely. If at any time minimum performance criteria are not met no payments are made for the relevant section of road.

Typical Payment Diagram

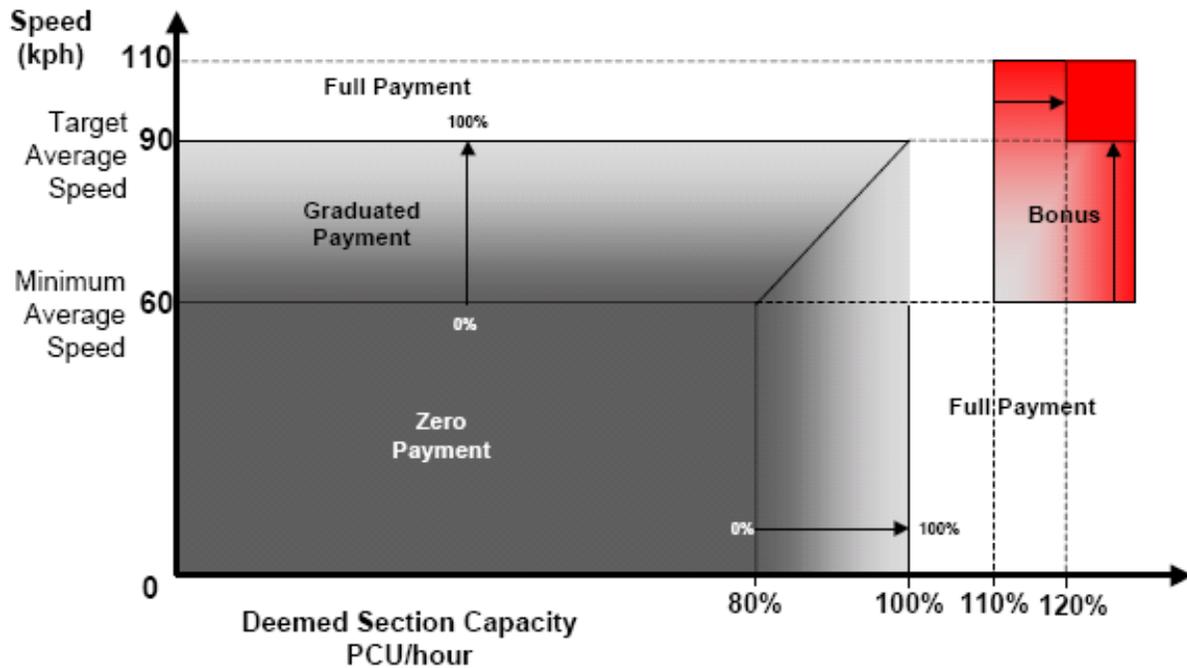


Figure 2: Congestion Management Payment on A1 Highway (Highways Agency, Leeds ²)

Using new monitoring and performance measurement technologies based on toll transponders or cell phone probes, this approach could be modified and extended to provide incentives for concessionaires to manage and develop corridors so that they move more people and more ton-miles of freight (rather than just vehicles) while meeting level-of-service standards, environmental performance standards, and the terms of community benefit agreements. Might not such a framework be used to expand the market for PPP toll concessions with broader public support won by delivering guaranteed performance to customers and communities?

III. U.S. Case Studies of PPP Toll Roads

A small sample of recent PPP road concession agreements related to both existing transportation facilities and the development of new transportation assets illustrates some of the range of experience with toll PPP highways recently advancing in the U.S.

California

SR-91, Orange County, California. The passage of AB 680 in California in 1989 opened the door for the California Department of Transportation to enter into franchise agreements for development of new roads. Two roads of note – SR-91 and SR-125 - have been developed under this law, which was repealed in 2005.

² see also: http://wip.tu-berlin.de/workshop/2005/papers/briggs_drewett_Private%20Financing_of_Projects.pdf

The opening in 1995 of the newly constructed Express Lanes in the median of California's SR-91 made this road the first fully automated, variably-priced toll road in the nation. Originally planned as an HOV facility, the four-lane toll facility was built years earlier than public funding would have allowed thanks to this PPP agreement. The facility was originally financed, owned, and operated under a franchise agreement between the California Private Transportation Company (CPTC) and the state.

Tolls on the roadway vary from \$1.05 during off-peak hours to \$6.25 during peak periods, although carpoolers with three or more people (HOV3+), zero emission vehicles (ZEVs), motorcycles, disabled plates and disabled veterans ride free during most hours. The revenues from the tolls are used to operate and maintain the roads, with no surplus revenue left over for transit or other uses.

Since the Express Lanes opened, the facility has logged more than 64 million vehicle trips and saved more than 32 million hours of commuting time. Yet, the HOT lanes have undoubtedly facilitated additional sprawl development in Riverside County, which serves as an affordable bedroom community to job-rich Orange County, offsetting some of the environmental benefits of the project.

The SR91 project development agreement between CPTC and the state contained a non-compete clause that barred public authorities from making improvements on competing transportation facilities. However, in 2002, under intense public pressure, the Orange County Transportation Authority purchased SR91 from CPTC so they could abrogate the non-compete clause and make improvements on parallel non-tolled lanes in the corridor (U.S. GAO 2004).

SR-125, San Diego, California. A franchise agreement with the San Diego Expressway Limited Partnership provided for the private financing and construction of SR-125, a 9.3-mile toll highway that forms the longest segment of a 12.5-mile highway that, when complete in 2006, will connect the California-Mexico border as part of an outer edge area beltway. Once the project is complete, the private concessionaire will transfer ownership of the road back to the State and then lease the rights to operate and maintain the facility for a period of 35 years. (FHWA, 2005; U.S. DOT, 2004)

The franchise agreement allows the private concessionaire to earn a maximum 18.5% return on total investment with additional allowed incentive return for actions to increase average vehicle occupancy on SR-125. However, last year the concessionaire claimed that without adding an additional 10 years to the agreement they will not be able to get a reasonable return on their investment. They argue that project costs have spiraled from \$400 million to \$635 million. Permitting delays, a lengthy environmental review process and a subsequent law suit brought in 2001 by the Center for Biological Diversity, Preserve South Bay, San Diego Audubon Society, the Sierra Club, and Preserve Wild Santee, contributed significantly to these cost increases. In fact, environmental clearances were not obtained until 2001, a decade after the franchise agreement was signed. The environmental groups that opposed this project did so because of its negative effects on sensitive wildlife habitat and because it will induce additional sprawl.

Virginia

Pocahontas Parkway. In 1995, the Virginia legislature passed the Public-Private Partnership Act (PPTA) of 1995, which enabled "private entities to acquire, construct, maintain, and/or operate 'qualifying transportation facilities' under agreement with a responsible public entity" Opened in 2002, the Pocahontas Parkway was the first project built under the PPTA. The Parkway is a toll road that serves as a bypass around Richmond. Under a 30-year franchise agreement, the road was designed and built and is now operated, including imposing and collecting tolls, by the Pocahontas Parkway Association, a nonprofit consortium. (Regimbal 2004)

The Parkway does not rely on variable or time-of-day pricing to determine the toll rate for drivers. Instead, toll rates on the road are static, currently \$1.75 for cars, trucks or buses using electronic transponders, and \$2.00 for vehicles paying with cash. The revenue is used to pay off the debt incurred to build the road (VDOT 2002).

Prior to the opening of the road, traffic estimates were developed based on motorist surveys and county growth projections. During the first year of operation, actual traffic and toll revenues were 42 percent less than the projected. Since then, traffic has increased, but not to projected levels. Much of the difference between the estimated and observed traffic levels has been attributed to slower than predicted economic growth in the Richmond area, and in particular at Richmond International Airport. (Regimbal, 2004; Samuel, 2005) The project is being refinanced in 2006.

Illinois

Chicago Skyway. The 7.8-mile Chicago Skyway was owned, operated and maintained by the City of Chicago for more than 50 years. City officials had not raised tolls on the road for more than 15 years, even though only a quarter of the traffic on the highway consists of City residents. Nor had they fully modernized toll collection and operations. Faced with a gaping budget deficit and an underperforming asset, the City of Chicago with little public consultation signed a 99-year concession agreement in 2004 with the Skyway Concession Company (SCC) – a partnership of Macquarie and Cintra. Under terms of the 300-page agreement, SSC got rights to boost long frozen tolls (within limits), and agreed to detailed standards for long-term maintenance of the highway, with some safeguards for labor and adjacent communities.

In return, the City of Chicago received \$1.8 billion. Of this, \$463 million went to pay-off the Skyway's debt, \$392 million was used to pay off city debt, \$875million was put into city government budget reserves, and \$100 million was dedicated to quality of life initiatives over the next five years, including funding for the homeless, home heating assistance, home modifications for the disabled, affordable housing programs, job training for ex-offenders, a Small Business Development Fund, and programs for children and seniors.

Indiana

Indiana Toll Road. The state of Indiana recently enacted legislation (HB 1008) authorizing a \$3.8 billion lease of the Indiana Toll Road for a 75 year period. The Act creates several trust funds which will be used primarily to accelerate a \$10.3 billion road construction program across Indiana, with detailed allocation of funding to various counties and projects, weighted towards the counties near the toll road corridor. Some funds are dedicated to job training in the depressed communities near Gary, through which the toll road passes, but there are no provisions to provide virtually non-existent transit access to connect the low income and minority areas of Gary and Hammond with the higher wage suburban activity centers that lie just south of the toll road. The deal has proven to be politically unpopular, especially in the toll road corridor. Much popular opinion is focused negatively on foreign companies controlling Indianan infrastructure.

According to the terms of the concession agreement, Statewide Mobility Partners – a partnership of Macquarie and Cintra – has the right to impose and collect tolls, subject to a toll increase schedule. The tolling provisions do not authorize the Concessionaire to raise tolls at times of congestion above the toll rate caps. The agreement includes prescriptive guidelines that call for the annual submission of various operating plans. However, the standards appear unclear and thus of limited contractual value. Monitoring and enforcement provisions appear weak.

Texas

Trans Texas Corridor. In 2003, Texas enacted state legislation (HB 3588) authorizing the Trans-Texas Corridor (TTC) project, The TTC project is slated to be the largest public works project in Texas history, a proposed 1,200-foot wide, 4,000-mile long network of planned and existing toll roads, railways and utility corridors, to be developed over the next 50 years. This network is designed not to connect any existing cities and towns, but to run almost entirely through what are now non-urban Texas counties. To date, two TTC corridors are advancing through the environmental review process, the 560-mile TTC-35 running north-south across central Texas, and TTC-69, a planned 1600-mile corridor running from Larado parallel to the Gulf Coast to northeast Texas.

In parallel with the TTC effort, Texas officials have recently made bold efforts to promote the widespread adoption of tolling under legislation authorizing Regional Mobility Authorities (RMAs) in metropolitan areas of Texas, seeking to accelerate substantial planned highway system expansion using tolling and PPP concessions. A half dozen RMAs scattered across the state were seeking to advance roughly \$20 billion worth of toll concession deals as of early 2006, focused on building new toll lanes or new toll highways.

In 2004, Texas officials received an unsolicited proposal from a private consortium - led by Cintra Concesiones de Infraestructuras de Transporte and Zachry Construction Corporation - to develop the initial element of the Trans-Texas Corridor, known as TTC-35. The Cintra-Zachry proposal includes \$6 billion in private investment to design, construct and operate for up to 50 years a four-lane, 316-mile toll road loosely connecting from near Dallas to near San Antonio. The proposal also transfers the right to build and operate TTC-35 as a toll facility from the state to the private consortium. In return, the state is to receive \$1.2 billion. These proceeds are to be used to fund road improvements or high-speed and commuter rail projects along I-35 or the TTC-35 corridor. The TTC-35 and several other proposed Texas toll highways are seen as a

strategy to redirect Asian freight traffic away from unionized U.S. west coast ports and trucking services, via cheaper Mexican ports and non-unionized Mexican trucking services and inland U.S. ports. (Howie)

Without public notice or input, the Texas Department of Transportation (TxDOT) signed a pre-development agreement (or umbrella agreement) with the Cintra-Zachry consortium in 2005, authorizing the preparation of a master plan, non-binding master financial plan, project management plan and quality management plan for TTC-35. Under the Special Experimental Program (SEP)-14 and the SEP-15 programs (under which U.S. DOT has asserted authority to waive provisions of federal transportation law), TxDOT selected a private partner prior to completing the NEPA review process and made this selection earlier in the planning process than is typically allowed under law. Almost two years after the signing of the deal, more than 200 pages of the 300-page pre-development agreement remain secret despite an order for their release by the Texas Attorney General that was blocked by a law suit filed by the concessionaire. (Corridor Watch)

This pre-development agreement provides Cintra-Zachry with unprecedented access and opportunities to evaluate and identify ways to finance a portfolio of commercially viable projects very early in the planning process. Such an arrangement has the potential to produce cost savings and other benefits that can flow from a fully integrated design-build process. But the sweeping powers conferred to TxDOT and its concessionaires under the authorizing law, HB 5388, as well as the manner in which this mega-project has thus far been advanced, has left many concerned that the project is likely to short-circuit or overwhelm environmental protections, override the interests of local governments and private property owners, and curb full consideration of viable alternatives, including investment and system management options that may might be considered in local and regional transportation plans but that lack current public financing. And many Texans just do not like the idea of paying tolls.

For these reasons, the TTC has been opposed by many local governments and environmental, civic and property-rights groups from the Sierra Club and Environmental Defense to the Texas Farm Bureau and Texas Republican Party. Efforts to reign in the TTC have had only limited success in the Texas Legislature, but a political backlash may yet pose a serious challenge to the wider use of tolls and PPPs. While Texas currently leads the U.S. in developing new toll roads, local opposition to tolls and PPP concession deals appears to be growing (see for example, <http://www.satollparty.com/post/>). El Paso officials voted down a plan for a Regional Mobility Authority in June 2006 only months after officials in Harris County, Texas, rejected a proposed long term concession agreement to lease their toll roads to a private operator.

IV. PPP Toll Road Concession Projects: Finding a Balanced Approach

As experience with PPP toll road concessions grow, a variety of issues are surfacing as opportunities where deals might come undone or be improved to support better transportation system performance, stronger protection for the environment and equity concerns, and increased community acceptance. This discussion is not comprehensive, but highlights several emerging areas where deals might be made more effective, challenged, or debated.

1. Non-compete Clauses

Non-compete clauses have been used to bar capacity improvements to adjacent public roads and public transportation facilities. To make improvements on parallel non-tolled lanes in the corridor, public authorities in California were forced to purchase SR-91 from CPTC so they could abrogate the original contract's non-compete clause. At the same time, non-compete clauses are important to private owners because improvements to local roads can result in less traffic and lower toll revenue. The original Dulles Greenway concession agreement did not contain a non-compete clause and the consequent expansion of nearby Virginia Route 7 by the state DOT played a significant role in suppressing demand for the toll road, forcing the project into default shortly after its opening.

The PPP world learned a lot from the SR-91 case. Shortly after Riverside County officials purchased the SR-91 Express Lanes, Caltrans officials amended the SR-125 concession agreement to remove restrictions on their ability to expand the capacity of transportation facilities not in the current long-term plan. In return, Caltrans must reimburse the private developer for revenues lost due to the expansion. This type of solution allows necessary improvements to occur but also protects the private partner. Today, it appears few public agencies are willing to agree to the type of rigid non-compete clause included in SR-91. Indeed on certain types of projects, the 2005 federal SAFETEA-LU federal transportation law, Section 1604(c), would bar such non-compete agreements.

The Chicago Skyway does not include any kind of non-compete clause. The Indiana Toll Road lease has a very limited non-compete clause, allowing local parallel expressways but not the creation of another statewide competing road within 20 miles of the leased road.

The SR-125 non-compete clause includes protection measures that ensure a minimum level of service. If congestion exceeds a certain threshold and the concessionaire is not diligently pursuing the development and construction of additional capacity expansion, they risk losing exclusive franchise rights to the tolled corridor. While this type of contract clause may help protect the public against degradation of service in the corridor, in combination with toll rate caps that are commonly part of PPP contracts, there is a real danger such a clause may prevent a concessionaire from considering or applying the most cost-effective traffic management strategies to avoid or reduce congestion delays, such as time-of-day tolls accompanied by better corridor transit and paratransit services, even where these may be more cost-effective and less harmful to the environment and communities adjacent to major highways.

2. Toll Rate Caps

Public-private partnership agreements use a variety of contractual techniques to control toll rate increases and maximum rates. Toll rate caps for the Indiana Toll Road are to be set according to a detailed toll rate schedule. The agreement allows the concessionaire to adjust tolls by time of day. However, the tolling provisions do not authorize the private owner to raise tolls at times of congestion above the toll rate caps. This impedes the ability of the concessionaire to apply time-of-day pricing to ensure free flowing traffic at all hours of operation.

Chicago Skyway maximum toll rates are also limited by schedule through 2016. But an exemption to this schedule allows the operator to raise tolls for vehicles with three or more axles at times of congestion above the toll rate caps. This enables the operator to use time-of-day pricing as a traffic management tool, but only for trucks and buses.

Under the terms of the SR-125 agreement, the private owner has the right to impose and collect tolls, subject to limitations on its overall rate of return. This provides flexibility to establish and modify toll rates by (a) various classes of vehicles, (b) vehicle occupancy levels, (c) times of use and (d) section.

An alternative to toll rate caps that might improve environmental performance would mandate toll adjustments by time-of-day might such that the tolled portion of a road remains free flowing at all hours of operation, with off-peak discounts, without limiting the maximum toll. Or such an approach could be linked to toll rate caps that do not apply to peak hour tolls, but to average daily toll collections, allowing the concessionaire to adjust the distribution of tolls among vehicle classes and by time-of-day for most efficient facility operation, while encouraging or requiring toll discounts for registered low income travelers and high occupancy vehicles (HOVs).

3. Environmental Performance Standards and Agreements

The environmental review process has been singled out by many industry groups and PPP advocates as the most significant impediment to private sector participation in the development of transportation projects. (US DOT, 2004) SR-125 illustrated to private sector partners the risks associated with proceeding on a project without environmental clearances in place, leading Macquarie to declare its unwillingness to fully commit to new concession agreements for greenfields road projects lacking in such clearance. Under the SEP-14 and SEP-15 programs, U.S. DOT has asserted broad authority to waive federal contracting and review procedures to encourage innovative activities to accelerate the development of PPP projects.

Public-private partnerships in combination with the SEP-15 program may enable agencies to push forward projects that stood little chance of being built under traditional procurement models. An important question then is whether these expedited agreements for the development of new transportation facilities can be designed to maximize consideration of alternatives that accommodate mobility growth while moderating the need for road system expansion and encourage a coordinated, transparent planning and environmental review with adequate public involvement. (Environmental Defense and NRDC, 2004)

The reality is that most state transportation agencies and public authorities are less risk averse than private transportation PPP developers and investors to the consequences of a long drawn-out or failed environmental review process that ends up having to be redone because of its inadequacies. Private sector project developers and investors want to learn quickly whether they can get a bankable deal accomplished. Conversations with the latter parties suggests that many are willing to consider alternatives, indirect, secondary, and cumulative impacts, and effective impact avoidance and mitigation measures, if they are asked to do so by public agencies or if this will reduce the risk that their project will be held up or stopped by regulatory or political

problems. Many are willing to see extra mitigation costs included if it results in a project that can get a robust approval with broad support of concerned stakeholders and still make financial sense.

These are all big “ifs,” but there are several strategies that can help ensure such a result, including the greater use of performance based contracting, environmental performance and community benefit agreements, and concession frameworks that seek to implement an array of cost effective “fix-it-first” asset management strategies, including, improved corridor operations, management, and transit or paratransit services prior to advancing major new capital investments.

However, most concession agreements to date have not taken this approach. While they may include clear and enforceable operating standards for such matters as toll collection, traffic safety and management and pavement quality, clear metrics for environment performances are rarely included as part of these agreements. Instead, environmental requirements in these agreements often take the form of rudimentary, process-driven standards that are difficult to measure, monitor and enforce. As indicative of the vast majority of concession agreements, the operating standards of the Indiana Toll Road concession lease include prescriptive guidelines and criteria for the development and annual submission an Environmental Management Plan. The problem with such standards is that they focus merely on “how” rather than “what” to achieve and the details are to be worked out long after the major money decisions have been made to put a value on the concession deal. At that point, better environmental performance may too often just look like an extra cost at risk of being value-engineered out as the concessionaire looks to cut costs.

Over the past decade, businesses and many governmental agencies have increasingly focused on establishing outcome-based standards to measure performance. Outcome-based performance standards focus on “what” objectives are to be met and allow flexibility in determining how best to achieve those objectives. One of the most frequently cited benefits of public-private partnerships is that such partnerships provide more flexibility to maximize the use of innovative technologies that can lead to the development of better, faster and less expensive ways to design, build and manage highway facilities. Mandating the annual submission of an Environmental Management Plan without standards, after the concession agreement has been negotiated and financed, will do little to spur the use of innovative technologies except as these might cut the concessionaire’s operating costs. Nor does it provide a strong incentive for robust environmental self-monitoring and compliance or oversight. A better time for all to focus on setting environmental performance goals is early in the design of the concession bidding process.

Clear and enforceable voluntary environmental performance agreements have not yet been incorporated broadly into PPP toll road projects, which have instead simply been subject to the routine application of existing federal and state environmental requirements on transportation projects. However, such performance agreements are coming into use in other transportation sectors, such as airport and port operations and infrastructure management.

- A 2004 Community Benefits Agreement (CBA) between local officials and residents regarding the modernization of Los Angeles International Airport serves as one example. In this instance, 26 community, environmental, labor, and civic groups agreed not to

challenge approval of an LAX expansion plan in return for an enforceable CBA that obligated a half billion dollars towards mitigation activities aimed at reducing air pollution and noise problems while ensuring other community benefits, such as job training programs for community residents.

- The San Pedro Bay Clean Air Action Plan, announced on June 27, 2006, lays out a framework for the Port of Los Angeles and the Port of Long Beach to work with their many private and public sector partners and stakeholders to ensure substantial measurable reductions in particulate and NO_x pollution from the overall activities of the ports while accommodating significant growth in freight traffic. This will be achieved by adopting a one in 10 million cancer risk standard that will be applied to all future leases, tariff changes, and project activities related to the port operations, coordinated with ground side port access plans and engagement with other ports across the Pacific Rim (Port of Long Beach, 2006).

Elements incorporated into toll road PPP concession agreements, or as enforceable parts of the accompanying environmental approvals, might include various provisions to ensure that tolls will be used to manage congestion and generate revenue for impact mitigation and that the project will be managed to produce superior environmental performance, public health protection, and respect for communities and others affected by the transportation system.

Environmental performance and equity in the distribution of benefits of tolled projects will be degraded if all toll revenues are dedicated to pay for new road capacity without ensuring adequate financing for provision of transit services in the tolled corridor. (Replogle and Funderburg, 2006). Where HOV lanes are converted to High Occupancy Toll (HOT) lanes or toll managed lanes, it is often practical to generate surplus toll revenues that can be dedicated to transit and impact mitigation, as on San Diego's I-15 HOT lanes. But where costly new road capacity is added, studies in many corridors show that it is often a struggle for such projects to be fully self-financing with tolls unless pricing is also applied to some of the existing corridor capacity.

To maximize environmental performance, PPP toll project designs should minimize new road capacity and instead consider applying tolls to existing HOV and general purpose lanes both to moderate the adverse impacts of new road capacity and to generate a revenue stream for monitoring, minimizing and avoiding adverse impacts. Among the impacts that might be considered are:

- Monitoring potential air pollution hot spots close to highways that might present a threat to public health or the environment. Purchasing improved ventilation equipment for nearby residences and schools.
- Making use of more costly, but longer-lasting and much quieter rubberized pavements to reduce noise impacts. Constructing sound barriers.

- Improving storm water management to remediate existing problems that cause combined sewer system overloads or that lead to excess storm water loads on nearby streams, producing erosion, habitat loss, and inadequate ground water recharge.
- Ensuring timely progress towards more equal access to jobs and public facilities without undue time and cost burdens for low-income people and those without cars who live or work in areas near the tolled corridor.
- Aligning the compensation and penalty structure of the concession so that contractors are clearly rewarded for superior environmental performance and penalized for failure to meet environmental performance standards, with incentives for timely compliance and for timely remediation of contracting failures.
- Careful monitoring of greenhouse gas emissions from transportation in the project corridor, subregional, or regional network, together with the development of strategies to reduce such emissions through mobility management, incentives, and market-based trading under a cap-and-trade system.

4. Use of Revenue

State enabling legislation typically specifies how toll revenues and lease proceeds are to be distributed. These revenue streams have been distributed for a wide range of purposes. The City of Chicago used the proceeds of its \$1.8 billion lease to close the budget deficit, set up a rainy-day fund, and invest in human service programs for the old, the young, and the poor. In contrast, the lease proceeds from the Indiana Toll Road are to be used primarily to accelerate a state-wide highway construction program. Any excess toll revenues from SR-125 are to be paid into the California State Highway Account.

This broad range in use of profits is indicative of the current disagreement among elected officials, transportation experts, and the public as to how best to re-invest such revenue. Some question the wisdom and morality of having toll revenues used to subsidize transit, claiming that such practice is simply a new taxation of mobility. Others argue it is often wise for PPP toll roads to cross-subsidize transit, viewing the transportation system as a portfolio of assets that should be managed to best address the array of objectives, stakeholder, and market place needs (Giglio, 2006). Dedicating a portion of toll or lease revenues to transit may help optimize mobility performance and increases the likelihood that the toll road will benefit a greater share of the potential travelers in the corridor, not just those who can afford to pay the tolls. It may offset some of the adverse impacts on those who live close to these roadways.

It is not uncommon for toll revenues or the proceeds of concession leases to be put into statewide or regional agency transportation funds, general government funds, or investments in other corridors. In the U.S. federal transportation bill reauthorization process in 2004-05, a broad coalition of transportation and environmental groups took the position that such diversions of toll revenues out of the corridor in which they are collected should be allowed for other transportation purposes only if a toll project operator is on track in meeting its financial obligations and satisfying the performance goals established for their project relating to

satisfactory operations and maintenance of the toll corridor, including meeting environmental, equity, and system performance objectives established at the initiation of the project. This language became a requirement under Section 1604(b), which pertains to the Express Lanes Demonstration Program, one of six programs established by SAFETEA-LU to authorize toll roads and toll lanes. Under that program (U.S. Congress, 2005) -

the Transportation Secretary, in cooperation with State and local agencies and other program participants and with opportunity for public comment, shall –

- (i) develop and publish performance goals for each express lane project;*
- (ii) establish a program for regular monitoring and reporting on the achievement of performance goals, including –*
 - (I) effects on travel, traffic, and air quality;*
 - (II) distribution of benefits and burdens;*
 - (III) use of alternative transportation modes; and*
 - (IV) use of revenues to meet transportation or impact mitigation needs.*

PPP concession agreements may employ various means to ensure that environmental, community and system performance goals will be met through the duration of the concession, including making these enforceable as part of environmental approvals and concession agreements, developing incentive-based performance contracting agreements, and considering such instruments as performance bonds, funding set-asides, and enforceable contingency measures.

5. Disclosure, Transparency, Oversight

The Chicago Skyway, Indiana Toll Road, SR-125 all mandate annual financial and performance disclosure, and require independent oversight and auditing of compliance with applicable laws. This is common practice in the PPP world. However, these deals fell short on providing opportunities for public input prior to contract approval. For instance, public hearings on the ITR Lease Agreement were held only after the lease was formally announced by Governor Mitch Daniels. Some lawmakers criticized the hearings as a pro forma process that insults the public (DeAgostino, 2006). In a similar manner, Texas officials signed the TTC-35 pre-development agreement without public notice. If the terms of public-private partnership agreements are negotiated in a more transparent manner and encourage public input, they may win easier acceptance by the public and other stakeholders, rather than facing delays and longer-term risks to regulatory and political stability.

Clearly there is a tension between concerns over confidentiality of business financial information and investor interests vs. needs for oversight, transparency, and timely disclosure to enable effective public input on major PPP projects.

A number of recent studies have revealed the tendency of traffic and revenue forecasts from green-field toll road projects to significantly overestimate demand and serious questions have been raised about conflicts of interest between forecasters and project construction interests (Barron, 2001; Plunkett, 2006). Revenue forecasting for existing highway facilities is a far more certain business, which makes concessioning of existing toll properties far less risky than

greenfield projects that are developing new right-of-way with uncertain demand. Advance forecasting of toll revenues from the application of tolls to existing untolled road networks, such as the cordon charging systems in London, Stockholm, Oslo, Bergen, Trondheim, and Singapore, is nearly as challenging a task as greenfield road revenue forecasting.

As a result of demand estimation problems, a large share of greenfield PPP toll road projects, including Pocahontas Parkway and Dulles Greenway in Virginia, the Orange County toll roads in California, and E-470 in Colorado, go through refinancing shortly after opening. Directly or indirectly, bondholders or taxpayers typically end up with the bill when project finances are restructured to extend the repayment period for bonds, spurring greater long-term financing costs. Public debate over the efficacy of long-term concessions has often been clouded by a lack of knowledge of the officials and stakeholders over trade-offs on the length of concession terms, or lack of opportunity for any public discussion because contracts are negotiated in secret. This too often cedes the public debate to cynical talk radio demagogues, undermining opportunities to help build public trust in informed civic leadership through open fact-based public deliberation.

Greater public oversight and independent auditing of transportation and revenue forecasts prior to final project approvals might help reduce some of these problems in the future. Beyond this, development of more effective performance-based contracting frameworks that focus on improving the operation of existing transportation corridors using shorter-term PPP operating and management concessions prior to any design-build investment in new capacity, as discussed elsewhere in this paper, may be a better way to ensure wise and cost-effective decisions about new corridor capacity.

V. Can PPP Concessions Bring On High Performance Metro and State Transportation Plans?

U.S. Metropolitan Planning Organizations (MPOs) and states face challenging new federal planning requirements that will press them to consider how to transform today's low efficiency roads into high performance corridors and networks. The 2005 SAFETEA-LU law requires regional transportation plans to include "operational and management strategies to improve the performance of existing transportation facilities." It requires state and metropolitan transportation plans to "achieve the objectives of the planning process," with a focus on serving mobility needs and fostering economic growth and development while minimizing fuel use and air pollution. And it requires "capital investment and other strategies to preserve the existing and projected future metro transportation infrastructure and provide for multimodal capacity increases." For MPOs and states to do all this under fiscal constraints is a tall order demanding new approaches.

While the law allows the agencies some discretion in determining how such planning objectives are to be achieved, it does not give them leeway to adopt plans that fail to make progress in meeting any of these objectives. The challenge will be to develop plans that accomplish all four objectives together, using appropriate measures of performance. The requirements are likely to give an impetus to strategies that create high-performance corridors, either through better public

agency coordination or new kinds of public-private partnerships, focused more on system operations and management and less on building new lanes.

Experience shows that there is a tremendous opportunity to cut congestion and reduce fuel use and air pollution with a combination of traffic management, signalization improvement, toll managed lanes, improved transit service, and market incentives such as pay-as-you-drive insurance and parking cash-out. This approach — along with the creation of complete streets that accommodate pedestrians and cyclists, bicycle-transit integration, and truck-only toll lanes — could be part of a comprehensive asset management framework.

Some states are already pressing forward. Oregon has for some years been moving to adopt a fix-it-first approach in its planning and asset management. Oregon DOT has linked its Highway Economic Requirement System (HERS) asset management analysis systems to some of the nation's most advanced transportation models to account for induced travel and behavior impacts of investment choices. Oregon has for some years used performance goals seeking to reduce traffic growth per capita and to manage sprawl, linking transportation investment decisions to land use and natural resource planning. Washington State is also advancing strategies to consider tolls as a traffic management tool, with a series of public outreach workshops being held in 2006 to help understand and inform public opinion to enable progress.

Performance-based contracting may provide a way forward in the face of public distrust. In a paper presented at the 2006 Transportation Research Board Annual Meeting, FHWA's Patrick DeCorla-Souza, described how this might work. An "Operate-Design-Build-Operate contract model" would focus first on inviting a concessionaire to operate an existing highway corridor for higher productivity with such strategies as improved transit and rideshare services, rush hour shoulder lanes, improved transit access, ramp-metering, and peak-period congestion management tolls. Investment in new capacity would follow only in response to a demonstration of cost-effectiveness compared with operational and service improvements. Peak period tolls set to manage congestion would not be retained by the private concessionaire as profit, but managed publicly with accountability and transparency (DeCorla-Souza, 2006; DeCorla-Souza, 2004).

Income of the concessionaire might be based on performance payments adapted from the approach used on England's A1 highway, based on system reliability, the number of people and amount of goods moved in the corridor without congestion, and meeting the terms of environmental performance and community benefit agreements. Real time continuous traffic monitoring systems could support contracting performance measurement and deliver real-time traveler information. Motorists might have their toll payment waived if they get stuck in traffic.

The recent experiences of Stockholm, London, Oslo, and other cities that have adopted congestion charging for central area highways and streets reveal the potential for winning public acceptance for tolling of existing highways. The public will respond positively when officials deliver tangible improvements in transportation system performance through road pricing, combined with better transportation choices. In each of these regions traffic speeds have been boosted sharply and congestion delay has been slashed by a quarter to a third with transit use and transit speeds growing sharply, delivering benefits for motorists, transit users, pedestrians, and delivery businesses.

Stockholm's experience is illustrative. Since the January 2006 implementation of a variable time-of-day central area cordon charge combined with adding 197 new buses and 16 new bus lines, motor vehicle traffic to and from the central city is down by 20-25 percent, with half the former motor vehicle trips switching to the public transport system, queue times are down 30-50 percent in most locations inside and outside the charging zone, CO₂ emissions are down 14 percent in the inner city and by 2-3 percent regionally. Before implementation, 44 percent of those polled in the region thought the cordon charge was a good decision and 51 percent thought it a bad decision. After less than six months of experience with the charge, 54 percent now think it was a good decision and only 42 percent think it a bad one. Attitudes of the business sector have gone from very negative to barely negative. (Stockholmsforsoket, 2006).

In the U.S., application of central area congestion charging is being seriously evaluated by the San Francisco Transportation Authority in a \$1 million federally-funded study that began in 2006. A coalition of business, civic, and environmental leaders in New York City is advancing a privately financed planning and impact analysis study of the concept for that region.

More widespread in the U.S. is the consideration of road pricing as a strategy for conversion of existing or planned HOV lanes to HOT lanes, in conjunction with additions of new lane capacity. A number of studies published by the Reason Public Policy Institute have advocated this approach (Poole and Orski, 2003). This approach is also embodied in a planning study due to be released by the Metropolitan Washington Transportation Planning Board in fall 2006 which envisions creating a 600+ lane-mile network of HOT lanes composed of existing or planned HOV lanes, including about 250 additional lanes of motorway capacity beyond what is now planned for 2030.

An alternative approach is to convert and upgrade metropolitan motorways in their entirety to metropolitan toll managed networks. Pat DeCorla Souza, heads the Value Pricing Program at the U.S. Federal Highway Administration, has been an articulate advocate for this approach. (DeCorla-Souza, 2003). This approach avoids the complex merges, direct connector ramps, and operational problems poised by creating and integrating parallel high-speed toll managed lanes next to lower productivity and often congested, low-speed, unmanaged free lanes.

Peter Samuel, editor of *Toll Roads Newsletter*, has opined that,

Poole-Orski HOT networks make most sense in metro areas with the gargantuan highways of 8 to 14 lanes such as those common in Los Angeles, Houston, Seattle, Phoenix, Dallas, New Jersey and Atlanta. In these you almost have to have dual-dual roadway arrangements to cope with weaving so wide are the roads... Other metro settings in which the primary highway network is of more modest scale will be better treated with FAIRnetworks instead. Minneapolis-St. Paul with its denser network of 4 and 6 lane expressways and New York with its many 4-lane parkways and 6-lane expressways are naturals for 'decolarization' - managing the whole facility as a peak period tollway. These just aren't big enough to shoehorn in any separate managed lanes. So in places with generally smaller highways like the Twin Cities, New York, Miami, Philadelphia, Kansas City, Cleveland, Cincinnati, and Portland the better approach may be decolarization of the highways. But there's no reason why the two concepts can't be

mixed in the same metro area, so for example Long Island could see the LIE managed as a Poole-Orski facility while the BQE, the Van Wyck and the parkways would be Decora tollways. (Samuel, 2003).

A recent study by Smart Mobility for Environmental Defense shows the impacts of a high performance corridor strategy in one portion of the metro Washington, DC region compared to business-as-usual. The Metro Washington MPO recently, added to its transportation plan and transportation program a proposed new \$3 billion, 6-lane tolled outer beltway that would run east-west for 18 miles in suburban Maryland, about 7-10 miles north of the existing Capital Beltway. Environmental Defense's 2005 study, using current official transportation and emission models, shows this would in 2030 increase gasoline use by 13 million gallons per year for the entire Washington metropolitan area compared to doing nothing, resulting in 2.5 more million metric tons (MMT) of CO₂, a 5 percent increase.

An alternative to this planned outer beltway that would at less cost improve existing highways with toll traffic management and public transportation represents a low end estimate of what might result from a high performance corridor approach. This latter scenario would do more to relieve traffic congestion and would reduce 2030 gasoline use by 29 million gallons per year, resulting in 4.7 MMT of CO₂, an 11 percent decrease from doing nothing. (Environmental Defense, 2005b). Thus, the high performance corridor approach would deliver a 16 percent decrease in CO₂ emissions by 2030 from business-as-usual. In the project study area, the proposed outer beltway produces hydrocarbon emissions 7 percent higher than doing nothing and 14 percent higher than the high performance corridor approach. The proposed outer beltway produces nitrogen oxide emissions 9 percent higher than doing nothing and 18 percent higher than a high performance corridor approach. (Environmental Defense, 2005a).

The new SAFETEA-LU planning requirements ought to prompt wider consideration of the full array of these strategies by state DOTs and MPOs in coming years – cordon charging, HOT networks, and fully toll-managed motorways linked to improved public transportation and other high performance transportation network strategies. While it remains to be seen how readily MPOs and state DOTs will embrace such an integrated approach, clearly planners will be spending more time in coming years focusing on how traffic operations, safety, and management of the existing system can deliver better performance. Guidance from U.S. DOT on criteria to quantify performance will be important in guiding state and MPO efforts to implement these new provisions. A notice of proposed rulemaking issued by U.S. DOT for comment in June 2006 does not yet provide such guidance, but there is opportunity to do so in a final rule expected in 2007.

It is noteworthy that at a House Committee on Transportation and Infrastructure Subcommittee on Highways, Transit, and Pipelines hearing June 27, 2006, Federal Highway Administrator, Richard Capka, said, "The answer is not just building extra capacity, but to maximize use of the current system. We need to make better use of the current system." He said policymakers should "look at the use of highways as utilities," adopting congestion pricing strategies to make the system work more effectively and to handle ever-increasing environmental impacts. (Bureau of National Affairs, 2006).

With highway, transit, business, and environmental interests all agreeing that road pricing will be a key part of the solution to mobility problems, there may be prospects for timely progress, after may halting efforts, in achieving high performance transportation corridors and networks.

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