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Governor's Business Council  
515 Congress Ave., Suite 1780  
Austin, Texas 78701  
Phone: (512) 481-0525  
Fax: (512) 481-0675

The Governor's Business Council Transportation Task Force would like to acknowledge the following organizations and contributing consultants and authors for their assistance with this report:

**David Ellis, Ph.D.**, Associate Research Scientist, Texas Transportation Institute

**Tim Lomax, Ph.D.**, Research Engineer, Texas Transportation Institute

**Alan Pisarski**, Consultant

**Wendell Cox**, Principal, Wendell Cox Consultancy

**Jennifer McEwan**, Consultant

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## **THE KEY FINDINGS**

1. Traffic congestion has a negative effect on economic growth. The largest transportation problem for Texas, now and well into the foreseeable future is the movement of people, goods, and services from point to point within the urban areas.
2. Texas's population will increase from 20.8 million in 2000 to as much as 36 million in 2025. Ninety percent of this growth, or as many as 14 million more people, will likely be in Texas's major metropolitan areas.
3. Traffic congestion is getting worse. From 1990 to 2000, while Texas's population grew by 23 percent, vehicle miles traveled increased by 41 percent, TxDOT spending increased by 45 percent, but the number of lane-miles increased by only 3 percent causing congestion to rise by 126 percent.
4. Texas currently funds normal transportation spending [excluding the Texas Mobility Fund] primarily through the following:
  - a. The state motor fuel tax - 20 cents per gallon (15 cents goes to transportation and 5 cents to public education).
  - b. The federal motor fuel tax - 18.4 cents per gallon.
  - c. Motor vehicle registration fees.
5. Maintenance and rehab of the existing system consumes approximately 85 percent of normal TxDOT spending [excluding the Mobility Fund], leaving less than \$750 million per year from normal spending for all new capacity lanes to be constructed throughout the state. Inflating maintenance, rehab, and new capacity costs could eliminate all normal funding currently available for new capacity lanes within 5 years.
6. Limiting transportation expansion to Metropolitan Transportation Plan (MTP) funding levels over the next 25 years will create a metropolitan area average Texas Congestion Index (TCI) of 1.48, a 98 percent increase in congestion over today's average TCI of 1.25. The Texas Metropolitan Mobility Plan<sup>1</sup> (TMMP) targets a 1.18 TCI by 2030 meaning a 30-minute midday trip in metropolitan areas will take only 35 minutes in peak-periods after adding 14 million people to the state's population. Current MTP projections indicate peak-period trips will take 167 percent longer in 2030 than the target.

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<sup>1</sup> The MTP scenario includes costs for planned reconstruction. The TMMP scenario includes no additional rehabilitation costs beyond what is included in the MTP.

7. To achieve the TMMP target of a 1.18 TCI value over the next 25 years requires the metropolitan areas fund an additional \$66 billion in state and local/toll roadway expenditures in excess of sources currently identified in the MTP using today's dollars.
  - a. This report estimates that approximately two-thirds of the \$66 billion, or \$44 billion, would need to be funded by the state based on historical funding trends, and the \$22 billion balance would be funded by local, toll or other sources.
  - b. The report estimates a total statewide, state-funded need equaling an estimated \$56 billion over the next 25 years. That total is comprised of \$44 billion in need in the eight largest metropolitan areas (these areas are covered in this report), an estimated \$9 billion in need in rural Texas, and an estimated \$3 billion in need in other urban areas of Texas.
  - c. The federal and state fuel taxes represent the bulk of transportation funding, are fixed amounts per gallon, and lose real value over time with inflation. Revenue streams must increase with inflation to keep the state's estimated portion of the shortfall at \$56 billion in today's dollars.
8. The funding solutions analyzed in this report assumed the \$56 billion statewide state-funded shortfall would need to be resolved. A few of the many options we analyzed are summarized below. In each of these options, as a result of expanding the roadway system, the cost to the consumer is directly offset by \$37 billion in reduced gas purchases resulting from reduced congestion. Furthermore, indexing the motor fuels tax will raise \$50 billion for public education.
  - a. One option that solves the entire shortfall is indexing the motor fuels tax annually by the increase in the Highway Cost Index (HCI), with a 4 percent cap on any annual increase. This option would allow the entire \$56 billion funding shortfall to be borrowed as needed using only this new revenue source (pledging only the new revenue protects the existing State Highway Fund 006 revenue). Our analysis utilized a 3.06 percent average annual HCI increase and allowed all necessary money to be borrowed and bonds to be retired by 2035. This option would require no initial increase in the motor fuel tax but would gradually increase the rate by inflation over the next 25 years. By 2030, the total estimated cost per household driving 15,000 miles per year would be approximately \$21 per month. After fuel savings from resulting from reduced congestion, total cost per household would be approximately \$13 per month.
  - b. Another option would be to index the motor fuels taxes to the HCI, with a 4% cap on any annual increase, and continue the pay-as-you-go approach. This option would require an up front fuel tax rate increase of 12 cents per gallon to fund the entire \$56 billion shortfall as needed over the next 25

years. As in the case above, the motor fuels tax would gradually increase by the rate of inflation over the next 25 years.

- c. Rather than index the fuel tax to inflation, another option would be to increase the tax up front. This alternative would require a one-time state fuel tax rate increase of 37 cents per gallon.
  - d. It is important to note that items a through c above address the state's \$56 billion portion of the \$78 billion shortfall. The remaining \$22 billion local/toll portion would still need to be addressed.
9. A \$66 billion investment by state and local governments in transportation infrastructure improvements over the next 25 years in the state's eight largest metropolitan areas makes good economic sense, generating \$541 billion in economic benefits (an 8.2 to 1 benefit cost ratio) broken down as follows:
- a. \$37 billion in fuel cost savings to consumers due to less congestion
  - b. \$104 billion in travel time savings
  - c. \$78 billion in economic efficiencies to business and their resulting economic impact
  - d. \$322 billion in economic impact of construction
10. Transportation improvements are needed to maintain the competitiveness of the Texas metropolitan regions. Among the aspects of competitiveness discussed in this report are the importance of both landscape and housing affordability.
- a. Landscape - Aesthetics are relatively inexpensive to add compared to the cost of roadway construction. Improving the look of roadways and roadside makes it easier for employers to attract and retain employees to the urban areas. It also softens the look of the new capacity lanes that are required to handle the state's growing population.
  - b. Housing – The state and regional unrestrictive growth plans, policies, and investments in transportation have resulted in the least expensive housing in the U.S. and lower congestion levels than comparable size metropolitan regions giving Texas an enormous economic advantage over other states. Mobility and housing affordability will continue to be related to one another and are critically important components of Texas' economic welfare.
11. Increased commerce from NAFTA impacts Texas more than other states. Truck traffic crossing the Mexico – Texas border between 1996 and 2002 increased at a

rate of 26 percent compared to an overall traffic increase of 10 percent. This trend is expected to continue or increase.

12. Accelerating transportation improvements through borrowing makes good economic sense. The examples used in this report generate \$16 billion in benefits while the \$1.28 billion in additional interest cost is nearly offset in its entirety by the avoidance of \$1.24 billion in construction cost inflation.



## **RECOMMENDATIONS**

1. Fund TxDOT's \$56 billion twenty five year statewide funding shortfall. This amount includes TxDOT's \$44 billion portion of the metropolitan shortfall as well as the projected \$3 billion urban and \$9 billion rural shortfalls. Current Metropolitan Transportation Plan projections indicate peak period trips will take 167 percent longer in 2030 than the TMMP goal of a 1.18 TCI congestion value. Eliminating the excess congestion provides \$541 billion in economic benefits to the state which include \$37 billion of actual gas savings to the consumer caused by improved mobility and \$104 billion in time savings. The shortfall should be paid for by some or all of the following:
  - a. To protect the purchasing power of the state and federal motor fuel tax, we must insure that the value of the two taxes is not eroded further by inflation. This can be accomplished by indexing the rates to the Highway Cost Index while capping annual increases at 4% per year to remove the risk of large annual increases. This would insulate approximately 85 percent of TxDOT's revenues from losing value to inflation.
  - b. Additional revenue generated from indexing should be placed separately in the Texas Mobility Fund or a similar entity. The bond debt to accelerate the state's portion of the entire \$56 billion construction shortfall could be borrowed as needed and repaid solely from the proceeds of this new revenue increment.
  - c. The use of toll roads where possible subject to the following:
    - 1) A region's construction and expansion of toll roads should in no way reduce or otherwise penalize the area for receiving its fare share funding allocations from TxDOT since these roads are paid for with local funding.
    - 2) Utilize local toll authorities when possible in an effort to reduce costs to the local taxpayer and to maximize cooperation and coordination between TxDOT and local transportation systems.
    - 3) All tolls, franchise fees, or any other charges or benefits derived by TxDOT or local toll authorities from within a region should be required to be reinvested in transportation or mobility projects within the same area without reducing the areas fair share funding allocations.
  - d. Regarding long term planning, aggressively borrow money to build improvements since interest expense alone is roughly equal to the cost of inflation of road construction and enormous additional savings are derived from accelerated completion. Regarding short term planning, aggressively expand the use of financing to accelerate the expansion of critically congested sections of the state highway system. Financing would allow

select critical projects to be undertaken sooner and completed more quickly often with significant benefit to cost ratios.

- e. Stopping and reversing the practice of diverting transportation taxes and other state funds intended for the maintenance, design, and construction of roads to non-transportation uses.
  - f. To the extent that these or other methods (indexing in conjunction with the Texas Mobility Fund, financing, toll roads, stopping diversions,) are not authorized sufficiently to pay for this shortfall, allow the metropolitan areas to pass a local fuel tax or increase the state motor fuel tax. Any local fuel tax increase should in no way reduce or otherwise penalize the area in receiving its fare share funding allocations from TxDOT.
2. It is increasingly difficult in the urban areas to improve mobility on the TxDOT system without working on and expanding local streets. The relief of congestion on the TxDOT system can be enhanced by widening, improving, and constructing local roads that will provide congestion relief for the TxDOT system. Consideration should be given to authorizing TxDOT to expand its use of funds “off the system” to relieve congestion “on the system.” The state should also give major urban areas maximum legislative flexibility to generate local revenue in addition to toll options, subject to a vote of the citizens being affected, to pay for the local road expansion necessary to achieve the TMMP goals. The state’s major urban areas disproportionately attract business and create jobs, and, to continue to do so, must have the ability to solve their transportation challenges as each region deems best.
  3. Continue the strategic planning process and annual monitoring of the progress in achieving the 1.18 TCI, including tracking revenue, cost of construction, and other components of the TMMP. Commit to increasing transparency of all TxDOT data, including revenues and expenditures. Annual publishing of TxDOT’s District and County Statistics (the DISCOS Publication) should be required as soon as possible after year end, and the data should be made available to the public on the department’s web site.
  4. Continue to allow the free market to dictate the growth of our regions as well as continue our existing land use and transportation policies that have contributed to Texas urban areas having the lowest cost housing of any large cities in the nation.
  5. Continue our commitment to highway beautification as a standard part of roadway improvement and expansion programs to improve our overall quality of life.

## **REPORT UPDATE AND REVISIONS**

This report was originally published in September 2006. Since that time, new data has become available, some calculations have been revised based on new data, and additional analyses has been performed. None of the new data has significantly altered the original analysis, concepts, key findings or recommendations. However, the changes from the original report resulting from this additional analysis are outlined in this section in order to incorporate the latest calculations. They are as follows:

1. In January 2007, new historical Highway Cost Index data became available. The new historical data changed the projection of future HCI values. The Comptroller of Public Accounts also published a new Long Range Economic Forecast in the Fall of 2006. Included in the economic forecast is a forecast of the Consumer Price Index. In the methodology used in this report, the future HCI values are calculated based on the historical relationship between HCI and CPI values. The new CPI value, as a result, also contributed to the change in projected HCI values. While these changes did cause some small differences in estimated tax rates, they do not alter the overall validity of the report. Specific values of the original and revised HCI values as well as the corresponding tax rates are included in Appendix V.
2. Costs to ultimate consumers were also calculated. The following table shows estimated fuel tax savings resulting from issuing bonds paid by indexed fuel are significant.
3. The value of benefits derived from the economic activity associated with construction of the improvements and increased mobility remained the same in this update. However, a benefit/cost ratio was calculated for the bonding scenario. In the bonding scenario sufficient to address \$56 billion in mobility needs, the benefit/cost ratio of completing the improvements is 6 to 1. This benefit/cost ratio includes revenue sufficient to retire all bond debt by 2035.
4. As a part of the update, the level of fuel tax under flat-tax scenario was determined. Using the 1.0 migration scenario for future population developed by the Texas State Data Center and assuming a fleetwide fuel efficiency increase from 19.8 to 23.1 miles per gallon over the study period, it was determined that a 37 cent increase in the fuel tax would be necessary in order to address a \$56 billion funding need.

*Shaping the Competitive Advantage of Texas Metropolitan Regions*

A	B	C	D	E	F	G	H	I	J	K	L
Year	Indexed Tax Rate	MPG	Annual Cost Current Gas Tax <sup>1</sup>	Annual Cost Indexed Gas Tax <sup>2</sup>	Annual Cost Increase	Estimated Fuel Savings from Improved Mobility <sup>3</sup>	Net Annual Cost After Fuel Savings	Total Increased Cost Per Month	Monthly Cost After Fuel Savings	Toll Round Trip Equalization Number <sup>4</sup>	Commuter Toll Fees Paid <sup>5</sup>
	(3.06%/yr Avg. Increase)	(personal autos only)			D - E		F - G	F / 12	H / 12	Assumes 3%/yr increase in toll rates	
2007	0.20	22.3	\$134.53	\$134.53	\$0.00		\$0.00	\$0.00	\$0.00	0.0	\$50.00
2008	0.22	22.5	\$133.33	\$143.99	\$10.66		\$10.66	\$0.89	\$0.89	0.4	\$51.50
2009	0.23	22.8	\$131.58	\$153.40	\$21.83		\$21.83	\$1.82	\$1.82	0.7	\$53.05
2010	0.25	23.0	\$130.43	\$164.58	\$34.15		\$34.15	\$2.85	\$2.85	1.1	\$54.64
2011	0.27	23.2	\$129.31	\$173.76	\$44.45	\$25.80	\$18.65	\$3.70	\$1.55	0.6	\$56.28
2012	0.29	23.4	\$128.21	\$183.04	\$54.83	\$53.19	\$1.64	\$4.57	\$0.14	0.1	\$57.96
2013	0.30	23.7	\$126.58	\$191.85	\$65.27	\$54.83	\$10.44	\$5.44	\$0.87	0.3	\$59.70
2014	0.32	23.9	\$125.52	\$201.28	\$75.76	\$56.53	\$19.23	\$6.31	\$1.60	0.6	\$61.49
2015	0.34	24.1	\$124.48	\$210.56	\$86.08	\$58.28	\$27.80	\$7.17	\$2.32	0.9	\$63.34
2016	0.36	24.3	\$123.46	\$220.42	\$96.96	\$60.08	\$36.89	\$8.08	\$3.07	1.2	\$65.24
2017	0.38	24.6	\$121.95	\$229.43	\$107.48	\$61.94	\$45.54	\$8.96	\$3.80	1.5	\$67.20
2018	0.39	24.8	\$120.97	\$238.70	\$117.73	\$63.85	\$53.88	\$9.81	\$4.49	1.8	\$69.21
2019	0.41	25.0	\$120.00	\$248.30	\$128.30	\$65.83	\$62.48	\$10.69	\$5.21	2.1	\$71.29
2020	0.43	25.2	\$119.05	\$258.23	\$139.18	\$67.86	\$71.32	\$11.60	\$5.94	2.4	\$73.43
2021	0.45	25.5	\$117.65	\$266.95	\$149.30	\$69.90	\$79.40	\$12.44	\$6.62	2.6	\$75.63
2022	0.47	25.7	\$116.73	\$277.00	\$160.27	\$72.00	\$88.27	\$13.36	\$7.36	2.9	\$77.90
2023	0.50	25.9	\$115.83	\$287.36	\$171.53	\$74.16	\$97.38	\$14.29	\$8.11	3.2	\$80.24
2024	0.52	26.1	\$114.94	\$297.79	\$182.85	\$76.38	\$106.47	\$15.24	\$8.87	3.5	\$82.64
2025	0.54	26.4	\$113.64	\$306.90	\$193.26	\$78.67	\$114.59	\$16.11	\$9.55	3.8	\$85.12
2026	0.56	26.6	\$112.78	\$317.67	\$204.88	\$81.03	\$123.85	\$17.07	\$10.32	4.1	\$87.68
2027	0.59	26.8	\$111.94	\$328.49	\$216.55	\$83.46	\$133.09	\$18.05	\$11.09	4.4	\$90.31
2028	0.61	27.0	\$111.11	\$339.38	\$228.27	\$85.97	\$142.31	\$19.02	\$11.86	4.7	\$93.01
2029	0.64	27.3	\$109.89	\$349.49	\$239.60	\$88.55	\$151.05	\$19.97	\$12.59	5.0	\$95.81
2030	0.66	27.5	\$109.09	\$360.90	\$251.81	\$91.20	\$160.61	\$20.98	\$13.38	5.4	\$98.68

Note: Assumes an average of 15,000 miles driven per year.

<sup>1</sup> Calculated at 20 cents per gallon.

<sup>2</sup> Rate indexed to the Highway Cost Index. Initial rate is 20 cents. The tax rate in 2030 is 66 cents.

<sup>3</sup> Estimated fuel savings adapted from Urban Mobility Study.

<sup>4</sup> Number of tolls the net fuel tax savings would pay for (assuming initial \$2.50 round trip).

<sup>5</sup> \$2.50 initial round trip toll times 20 trips per month (one round trip per typical work day).

## **EXECUTIVE SUMMARY**

### **Introduction**

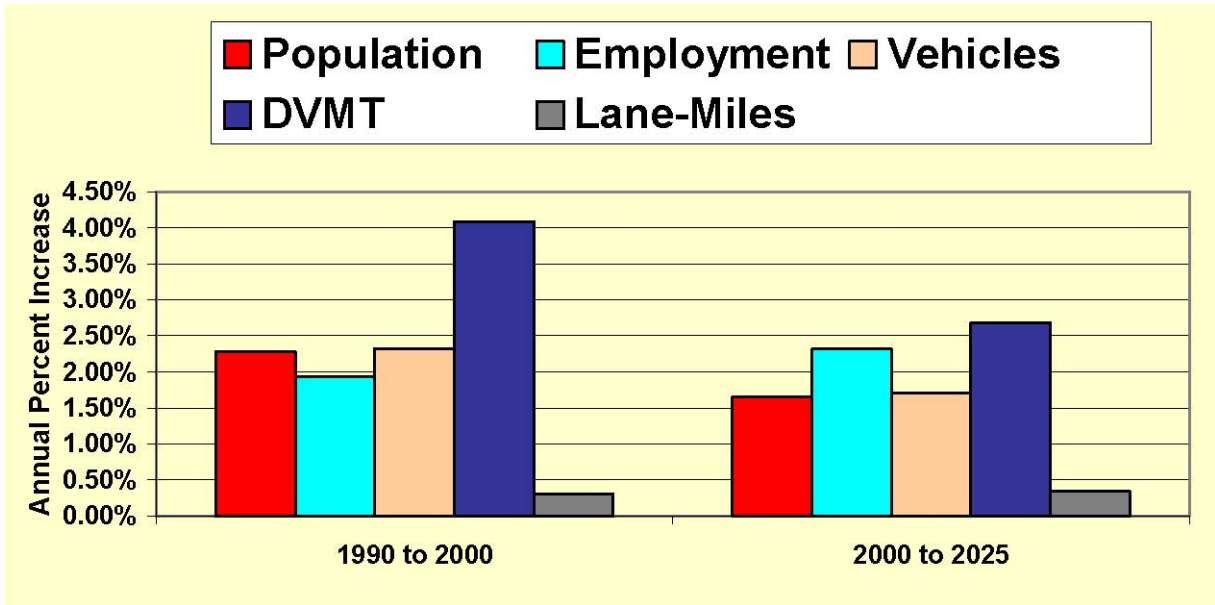
The future of Texas is tied to the economic health of its metropolitan regions. Texas has flourished because of several aspects of policy and development practices. One of the outcomes of the past is that transportation is a vital part of Texas' future. Traffic congestion threatens this future and is projected to increase in every metropolitan region with the currently expected funding. This report investigates what can be done to improve mobility in the next two decades and the important accompanying elements of that improvement.

The problems we face are a product of growth and affluence and the result of Texas' approach to development. Our economy is healthy and more growth is expected in the future. With this growth come challenges. As we move into a new era of labor force change in which the nation's labor force is aging, a new set of factors will serve to guide economic development. One of these will be the need to attract skilled workers. In many cases these workers will be working in fields, such high technology and services, where they can be almost anywhere. Quality of life issues – mobility, beautification, housing affordability, school quality and transportation – will be the keys to successfully competing for and retaining this future work force.

### **Improving Mobility**

Texas is an urban state. Seventy percent of the current population lives in the eight largest metropolitan regions, and 90 percent of the growth in the next two decades will occur there.

Vehicle travel has grown much faster than population in the past two decades. This is expected to be more equal in the next two decades. Economic growth will happen, but it will be easier to address. Current trends point to a closer match between the growth in vehicle travel and lane-miles which should help minimize the increase in congestion.



Changes made to transportation finance over the last two state Legislative sessions and the resulting improvements in planning processes mean that future congestion levels are not expected to be as bad as projections of just a few years ago. But more needs to be done.

The report estimates that over the next 25 years the metropolitan areas will require \$66 billion in roadway expenditures in addition to the \$120 billion available from currently identified sources to achieve the Texas Metropolitan Mobility Plan (TMMP) target of a 1.18 TCI value. For the purposes of this report, it is estimated that approximately two-thirds of the \$66 billion shortfall required to meet the mobility goals would be state funds and one-third of the funds would come from local/toll/other sources. This assumption is based on existing state-local funding shares. Under this assumption, the total cost to the state to achieve the metropolitan mobility goals is estimated to be \$44 billion over 25 years. This is less than the \$78 billion in TxDOT needs estimated in the first Governor’s Business Council report in 2003. There are several reasons for the reduction:

- The TMMP’s Texas Congestion Index (TCI) target of 1.18 is slightly higher than the 1.15 established in the 2003 Governor’s Business Council Report. The higher target value requires less funding. A more detailed assessment of the congestion problem in each of the eight largest metropolitan regions developed a mobility target for each area that cost effectively addresses that region’s problem. The TCI measures the extra travel time in the peak period compared to the travel time in free-flow conditions (a TCI of 1.30 indicates a 20-minute midday trip will take 26 minutes in the peak).
- The statewide planning process, initiated by Governor Perry and being carried out by TxDOT and the Metropolitan Planning Organizations (MPOs) using a needs-based approach with a mobility goal, appears to have resulted in a more effective

planning process that will lead to more focused road construction that will further lead to lower expenditures to attain the same congestion targets.

- The recent round of Metropolitan Transportation Plans (MTP) updates includes more toll roads which reduce congestion more than was projected.
- A more detailed analysis was used in this report to estimate the TCI values. Much more detail, available from the improved planning process, allows for a more accurate roadway needs estimate. The new process focuses on providing additional capacity to congested road segments rather than a generalized process of adding enough roadway to address average congestion problems.

### **Reconciliation with TxDOT Predicted Shortfall**

This report identifies \$66 billion in unfunded need over the next 25 years in order to meet TMMP mobility goals in the state's eight largest metropolitan regions compared to TxDOT's estimate of \$68 billion. For all practical purposes these estimates are virtually the same. TxDOT's estimate of \$86 billion in need over the same period of time statewide differs significantly from the GBC-2 report because it includes the local share of TMMP funding (\$22 billion) and the original Texas Urban Mobility Plan (TUMP) estimate of \$9 billion (versus the more current estimate of \$3 billion today). These items account for the difference between TxDOT's estimate of what their funding needs are (\$86 billion) versus the GBC-2 estimate of TxDOT's statewide funding shortfall (\$56 billion).

### **How to Fund the Shortfall**

While our report primarily covers the metropolitan areas, the estimated cost of the state's total congestion problem was utilized in the GBC-2 financial analysis to realistically evaluate funding solutions. As discussed above, the TUMP preliminary results of detailed analyses of mobility needs in the 17 smaller metropolitan regions as of the summer of 2006 indicated approximately \$3 billion would be needed in excess of available funding. The rural congestion needs have been estimated by TxDOT at \$9 billion. Therefore, the statewide congestion problem that might be realistically viewed as the responsibility of a fuel-tax based solution was \$56 billion – the total of the \$44 billion state portion of the metropolitan regions needs, the \$3 billion from urban areas and \$9 billion from the rural areas.

Funding the \$56 billion state shortfall can be accomplished in a variety of ways.

The motor fuel tax continually loses value to inflation over time because it is assessed on a gallon of fuel rather than on the price of fuel. Today, because of inflation, the 20 cent per gallon fuel tax enacted in 1991 is now worth approximately 14 cents (see Section 1 of report). One solution to this problem is to increase the state fuel tax annually by an amount equal to a measure like the Highway Cost Index (HCI) multiplied by the state and federal fuel taxes in order to keep pace with the cost of constructing and maintaining

roadways. This would protect purchasing power, insulating approximately 85 percent of TxDOT's base recurring revenues from losing value to inflation.

One solution to the \$56 billion state funding shortfall would be to place the additional revenue generated from the indexing process into the Texas Mobility Fund, or a similar vehicle that would allow borrowing against that revenue stream. If the 20 cent per gallon fuel tax rate was not initially raised but simply adjusted in the future by a rate equal to the increase in the Highway Cost Index (HCI), the projected 3.06 percent average annual increase would be sufficient to borrow the estimated \$56 billion shortfall. The bond debt could be serviced entirely with the proceeds from the incremental fuel tax increase.

Other potential solutions to the \$56 billion state funding shortfall include the following options. The reader should remember that there is an additional \$22 billion in metropolitan congestion relief needs that has been allocated, based on historic funding patterns, to local governments, toll roads and other local authorities and funding arrangements.

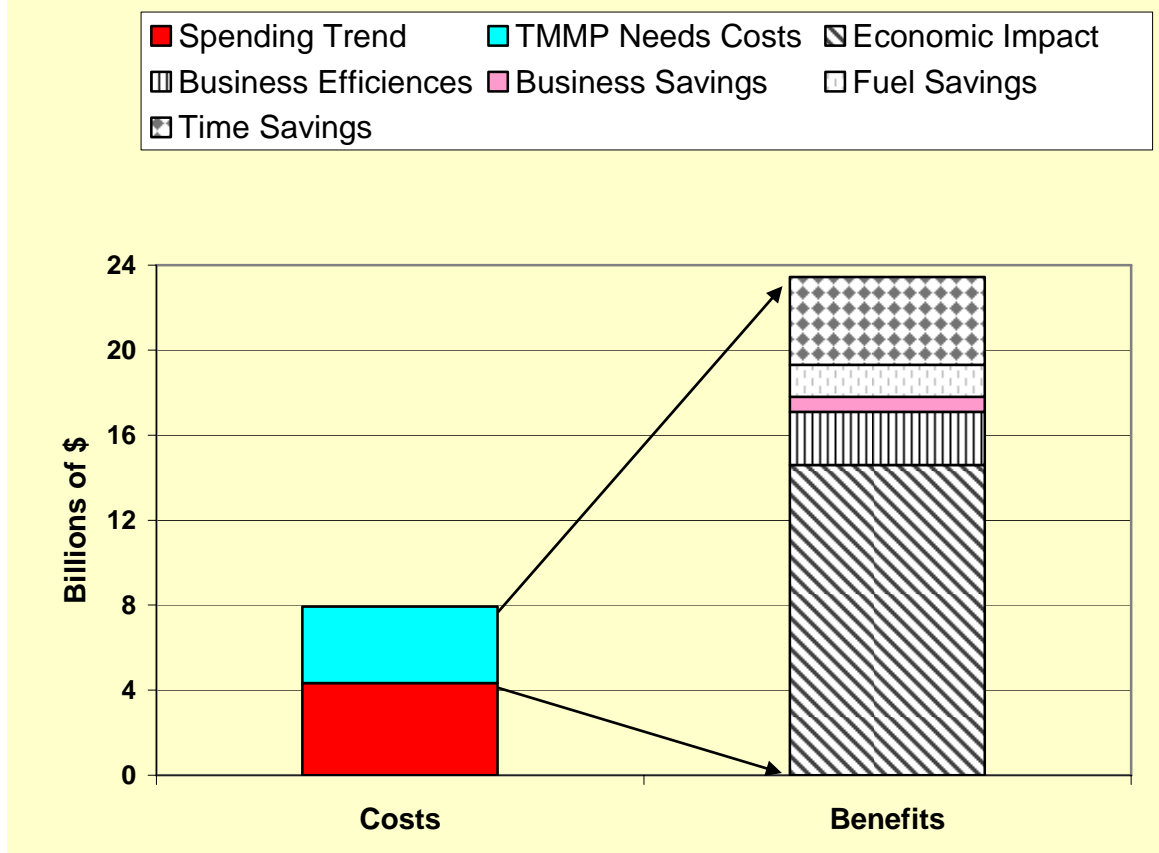
- Use of toll roads where possible -- Toll roads that offset the state funding share would allow the construction of critical projects in the absence of traditional transportation funding sources.
- Stopping the diversion of state transportation revenues into non transportation related purposes allowing transportation dollars to be spent on transportation projects.
- Index the state motor fuels tax and not borrow-- If the state motor fuel tax was indexed by an amount equal to the amount of increase in the HCI on both the state and federal motor fuel tax, an 12 cent initial fuel tax increase would be necessary..

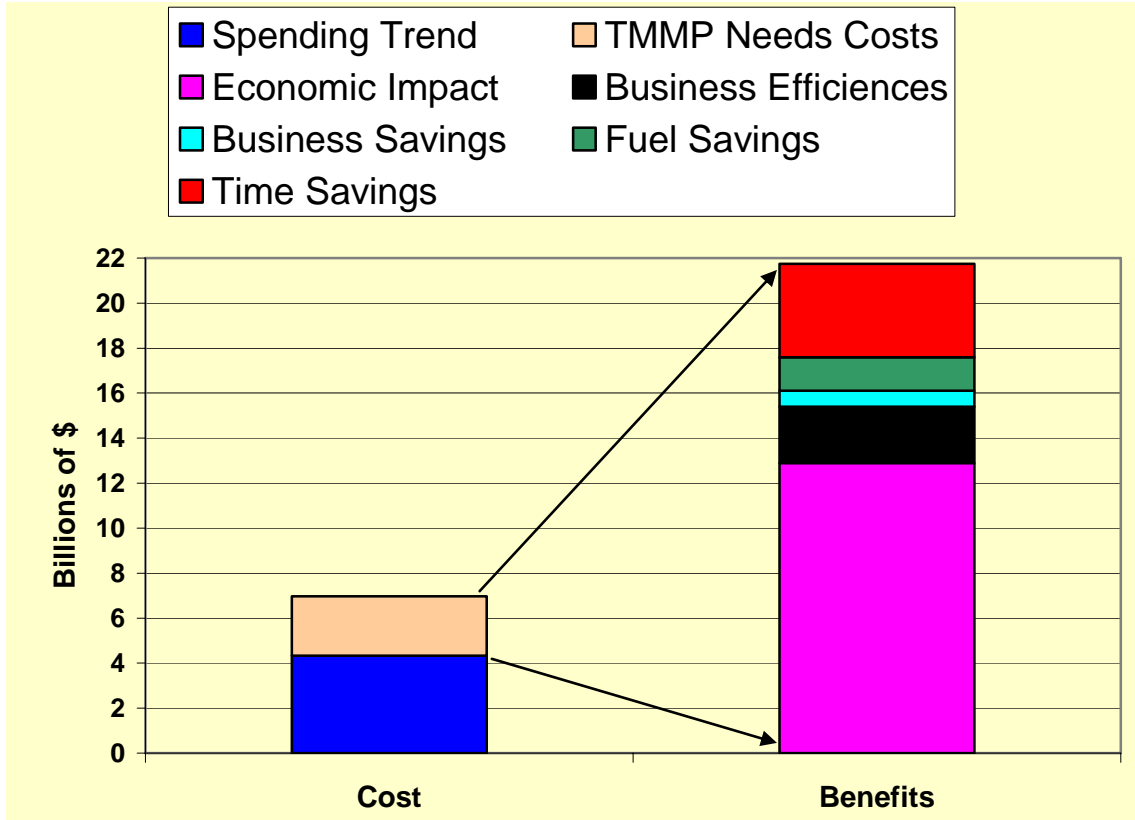
### **Benefits of Reducing Congestion**

The benefits from achieving the mobility targets are substantial. For the \$66 billion additional state and local investment in our metropolitan region transportation system we receive over \$541 billion in total benefits. These include more than \$37 billion in fuel cost savings and an estimated travel time savings of almost \$104 billion. Business efficiencies and business operating savings due to reduced congestion are estimated at almost \$78 billion. The effect of the construction activity is projected to add approximately \$322 billion to these benefits. Put another way, as a result of the expenditure of an additional \$2.65 billion annually, \$21.7 billion in annual benefits are realized through savings and additional economic activity.



### Annual Costs versus Benefits of Implementing The Metropolitan Region Needs-Based Plan





There are some risk factors, however, associated with the estimate of available funding. As an example, it is not clear at this point what the effect of significantly higher fuel prices will be on travel patterns, subsequent fuel consumption and transportation system needs. It is possible that a rise in fuel prices could lead to a reduction in travel demand and consequently reduce the amount of funding required for highway system capacity additions.

**Benefits of Accelerating the Construction of Road Improvements Using Financing**

The investment needs identified in Section I are a combination of the current deficiencies of the existing system with those investment needs that will be generated over time from future population and economic activity growth. Were the present system perfect in performance and condition, meeting future needs over time would be a relatively straightforward undertaking. It is not, and the benefits from accelerating the response to the extensive state and local backlog of needs are substantial.

While the full-scale backlog of investment requirements in highways should be identified, the present congestion levels throughout the state shown in Section I are an implicit indicator of the massive backlog of system performance needs. On the condition side there were 2,580 bridges in the state identified as of 2004 as Structurally Deficient and another 7,615 identified as Functionally Obsolete. Thus a total of 10,195 bridges, more than 20 percent of the state’s bridges, were labeled as deficient out of a total of

fewer than 50,000 bridges in the state. While this is better than many other states, it is a strong indicator of a critical backlog in terms of safety and performance.

Addressing the backlog by shifting to an accelerated program in which projects are started sooner and constructed more rapidly have immense payoffs:

- the benefits of the project in safety and performance are provided sooner
- cost growth effects of inflation are reduced (roughly equal to additional interest expense on bonds sold to pay for improvements)
- other beneficial projects can be brought forward into the project stream
- there are often logistical benefits to contractors working faster in larger undertakings

Other states have recognized these payoffs and are acting to accelerate their programs, often cutting delivery times to one-third of traditional approaches, with a combination of re-organized programming of projects, bonding, toll-oriented systems, and joint private-public efforts. The early benefits of this approach for Texas are substantial.

The report documents the benefits from mobility improvements in each region – the “what gets done” benefit. Another essential aspect of this improvement is the “how it gets done” benefit. There are enormous benefits to building the improvements faster and closer to when they are needed rather than waiting for funding streams to provide the needed infrastructure. The report investigates some of the issues related to financing the needed improvements and suggests additional study to dramatically speed system expansions.

- Expanding roads now provides significant mobility improvements resulting in travel time and fuel consumption savings to residents and commuters. The fuel savings from mobility improvements alone, assuming \$2.80 per gallon gasoline, represents \$37 billion in out-of-pocket cost savings.
- If an approach that recognizes the importance of rapidly improving the road network were used, the cost of borrowing construction funds would be approximately offset by the inflation in construction costs.
- The cost of borrowing to finance improvement is roughly equal to the inflation cost associated with deferring construction. Therefore, the cash outlays to the state over 25 years are approximately the same. To accelerate \$36 billion in major projects in congested corridors costs \$1.28 billion in additional interest, but saves \$1.24 billion in inflated construction costs and provides benefits exceeding \$16 billion. The societal benefits include \$2.2 billion in out-of-pocket fuel savings due to congestion reduction.

## **Beautification Programs**

The Texas Department of Transportation has an extensive program of planning roadway aesthetic improvement. These plans include structures, the roadside and plantings in a combined set of treatments that are both visually pleasing and easily maintained. Aesthetic treatments are recognized as important factors in the perception and acceptance of major roadway improvements, and in many metropolitan regions these improvements appear to be a significant feature of public input, public discussion and acceptance of a major construction program. Many aesthetic treatments are considered a normal component of a roadway project and are included in most new construction projects. Their relative cost, in these cases, is quite low and typically included in new capacity or major reconstruction projects.

The most frequent generator of favorable and unfavorable responses, however, was the area outside of the right-of-way. Addressing the quality and look of adjacent developments will take time, but providing maintenance and litter control are relatively less complex activities that have significant benefits in improving the visual landscape.

The landscape portion of this effort has resulted in a broadly similar practice on TxDOT construction efforts. “Naturalized plantings” that replicate native plant communities are installed within the right-of-way at the conclusion of construction activity. Local agencies or groups are responsible for maintaining any of the ornamental or special landscaping elements.



Natural plantings and aesthetic roadway designs

## **Emissions**

Over the next 25 years, 88 percent of existing emissions will be eliminated due to improvements in emissions control technology, fuel mixtures and vehicle operating systems regardless of the amount of congestion. If congestion is reduced, emissions will decline further while accommodating all projected travel increases due to population and employment growth.

- Total emissions are an average of 80 percent lower than current amounts despite travel increasing between 50 and 175 percent in the metropolitan regions.
- Emissions per million vehicle miles are forecast to be approximately 88 percent lower than current rates.

### **Competitiveness and Traffic Congestion**

Nearly all growth in the United States has been in metropolitan regions since World War II. Metropolitan regions have grown because they are efficient labor markets that provide economic opportunities that are generally more favorable than in other areas. One of the keys to Texas competitiveness has been the fact that its urban areas have generally lower levels of traffic congestion than other urban areas of similar size. Implementation of the Texas Metropolitan Mobility Plan Mobility Objectives is likely to improve mobility in Texas metropolitan regions even further, widening the gap with other areas throughout the nation.

Texas metropolitan regions are very competitive. Dallas-Fort Worth and Houston are the third and fourth fastest growing large urban areas in the high-income world (Atlanta is number one). Research indicates that metropolitan regions have greater economic output if they are more mobile. The critical issue is the number of jobs that can be accessed by employees in a particular period of time (such as 30 minutes).

Densification (land rationing) policies are sometimes suggested as a means for reducing traffic congestion. In fact, densification increases traffic congestion. Travel speeds become more erratic, which leads to more intense air pollution emissions.

### **Competitiveness and Housing**

Texas metropolitan regions have among the best housing affordability in the nation. The lower cost of living in Texas contributes to the state's competitiveness. In 1999, Dallas-Fort Worth and Houston had the most affordable housing among urban areas with more than 3 million persons. There are indications that this advantage has been expanded in the last five years.

The latest data indicate that if housing affordability in Dallas-Fort Worth were at Boston levels, median household income would need to be \$10,700 higher to support the higher annual mortgage payments. That same house in San Francisco would require a median household income \$20,700 higher than current Dallas-Fort Worth levels.

Denser land development patterns and restrictive growth policies are associated with artificially higher housing values. Metropolitan regions with land rationing have approximately 50 percent higher affordability multiples than areas without such policies. More recent research associates more stringent land use regulation with less than expected economic growth.

Texas metropolitan regions have not severely restricted the growth patterns, and, as a consequence, the cost of development is relatively low, allowing decisions to be made to build on the most economically viable parcels. This process is supported by the transportation investments that have been made over the past several decades. The superior mobility levels in most metropolitan regions provide a wider range of housing and job location choices than similarly-sized regions. Present Texas land use and transportation policies should be continued, which will maintain and improve the state's competitiveness, while providing housing opportunity and a better quality of life for a diverse population.

## **Freight**

Trucks carry 60 percent of freight in Texas. National projections indicate that truck traffic is increasing at a faster rate than that of cars and sport-utility-vehicles. The faster truck growth rate makes it more challenging to provide sufficient new roadway space to control traffic congestion.

Large trucks use 3.8 times more highway space than cars and sport-utility-vehicles on an urban freeway. In recent years, the safety record of trucks has been substantially improved, although there are still more than 400 fatal accidents that involve trucks in Texas. It is important that efforts be continued to improve truck safety. One of the most effective means for improving truck and other vehicle safety is to provide sufficient roadway capacity.

Texas is impacted by NAFTA commerce increases more than any other state. There have been substantial increases in truck traffic at border crossings between Texas and Mexico. There is a need for more information on truck traffic in Texas. TxDOT and the MPOs should undertake efforts to estimate truck volumes within metropolitan regions and on major freeway segments on an annual basis.

Various strategies can be used to better facilitate truck traffic. For example, truck only lanes and roads can be built. There may also be opportunities for targeted improvement, such as intermodal projects to improve both truck and rail freight movement at ports (such as what has been implemented in Los Angeles and is being evaluated in Houston).