Funding the Future

A Forecast of Transportation Finance
Jointly Produced By
Texas Association of Metropolitan Planning Organizations,
Texas Transportation Institute,
Center for Transportation Research,
& Texas Department of Transportation

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Funding the Future Workgroup

Brian Barth
Deputy District Engineer
Texas Department of Transportation, Fort Worth District

Andrew A. Canon
Transportation Director
Hidalgo County Metropolitan Planning Organization

Christopher Evilia
Director, Metropolitan Planning Organization

Jeanne M. Geiger
Deputy Director
San Antonio, Bexar County Metropolitan Planning Organization

Ron Hagquist
Researcher
Texas Department of Transportation, Government and Public Affairs Division

Dan Kessler
Assistant Director of Transportation
North Central Texas Council of Governments

Ashby Johnson
Deputy Director, Metropolitan Planning Organization
Houston-Galveston Area Council

Randy Redmond
District Engineer
Texas Department of Transportation, Beaumont District

Jessica Castiglione
Mobility Engineer
Texas Department of Transportation, San Antonio District

Contributors

Texas Transportation Institute

Project Director: Dr. Bill Stockton
Dr. Tim Lomax
Dr. David Ellis

Center for Transportation Research

Project Director: Rob Harrison
Dr. Khali Persad
Lisa Loftus-Otway
Seokho Chi
Patricia Franco
Prakash Singh
Alejandra Cruz-Ross

University Of Texas School of Engineering

Transportation Systems Management Graduate Course
Professor: Dr. Michael Walton
Semester Project: Evaluation of the JACK Model
Students:
Lu Gao
Andrew Karl
Eleni Pappas
Daniel Pachy
Melissa Thompson
Dan Seedah
Beatriz Rutzen
Hui Wu
Yao Yu
Sruthi Peddibhotla
Migdalia Carrion
Tadahisa Muramatsu

Executive Summary

This report is a part of an extensive analytical effort to provide the best possible information for state and local planners and decision makers. It is the product of a project by the Texas Association of Metropolitan Planning Organizations (TEMPO) and the Texas Department of Transportation (TxDOT) to produce an estimate of expected conventional revenues through 2035, and quantification of possible revenue enhancements. In a separate but complementary project, the Texas Transportation Institute and the Center for Transportation Research, under direction of the 2030 Committee, have developed comprehensive estimates of Texas' road capacity needs and system maintenance needs. Combining the results of the TEMPO revenue forecast and the 2030 needs estimate provides an unprecedented depth of insight into the statewide transportation financing challenge over the next two decades.

Uncertainties are inherent in any effort to forecast revenues for transportation, therefore a scenario approach was used to model the impacts of different combinations of multiple likely fundamental factors . Identifying the likely factors necessitated developing numerous underlying assumptions, these assumptions were determined by group consensus of the TEMPO/TxDOT committee.

This report delineates three likely scenarios of fundamental factors such as state population growth, anticipated fuel efficiency, and Federal Trust Fund availability. In addition, the analysis includes selected scenarios of potential revenue enhancements. There are obviously an enormous number of possible combinations of these factors that could be examined. Therefore, a revenue-forecasting model (TRENDS - *Transportation Revenue Estimator and Needs Determination System*) has been developed and validated (also by TTI and CTR) which allows extensive and rapid "what-if" scenario analyses by policymakers of the critical factors affecting revenues as well as alternative policy options.

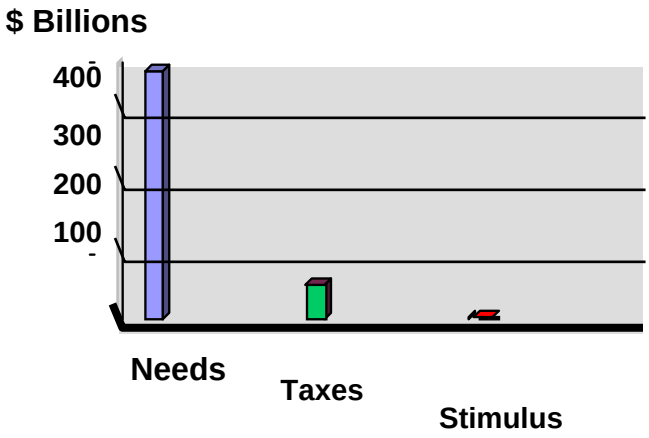
The results best stated simply as, " barring significant changes in policy, most likely scenarios result in decreases in the quality of maintenance of the existing system and increases in congestion." In fact, reasonable scenarios result in no funds being available for congestion relief if maintenance is funded at reasonable or declining quality levels

This study found that over the next two decades, fuel consumption will decrease because of the impact of greatly increased fuel efficiency, despite the expected increase in driving population. This would actually decrease motor fuel tax revenues relative to today; and when accounting for inflation, ***greatly*** decrease them.

Coupled with the results of the 2030 Committee's corresponding study of need, it is clear that major policy changes in transportation funding will be needed for the state; otherwise, there will be continued increases in congestion and reduced levels of maintenance. And it is highly unlikely that the beleaguered Federal Highway Trust Fund, itself also subject to fuel-efficiency erosion, will be available to solve the problem for Texas with major federal policy changes.

– Foreword –
How Does the Stimulus Change The Transportation Picture?

The $2.2 billion of ARRA Federal economic stimulus funding that the state of Texas has received for transportation is perhaps best understood in the context of "business as usual" finances. In 2008 the TxDOT motor fuel tax receipts were $2.3 billion and total funds received by TxDOT were $6.8 billion. So the stimulus in effect advances the state's transportation revenues by about one year's worth of gas tax revenues or about 4 months worth of funds routinely received by TxDOT.



Another meaningful context is comparing the stimulus to the projected needs on the timeframe of this report. Comparing the projected revenue of the TEMPO analysis to the projected needs of the 2030 Committee (discussed in Chapter 5), the challenge is how to meet the funding gap in Texas of $330 billion over the next two decades. The stimulus meets a little over one half of one percent of that unfunded need, so it changes the transportation finance picture very little, although it is at least a tangible recognition of the role transportation has in the economic vitality of the nation.

RECENT DEVELOPMENTS

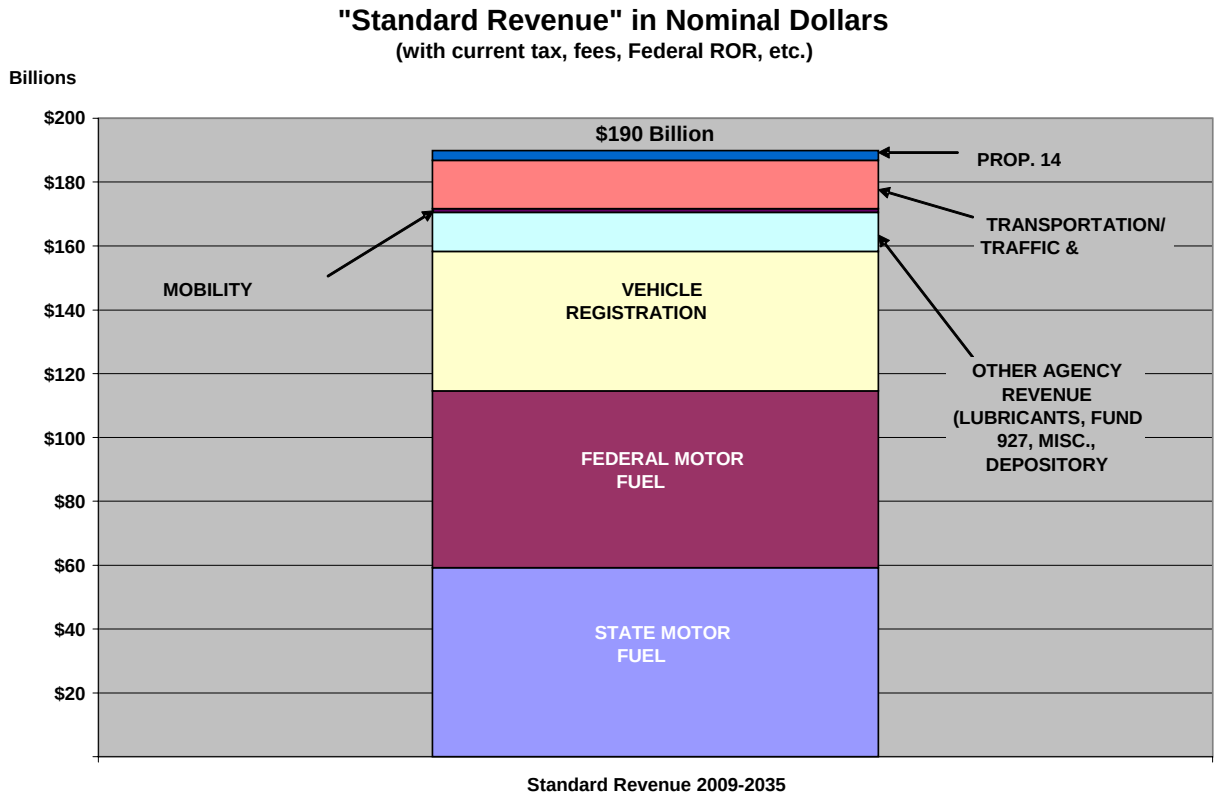
TxDOT's Chief Financial Officer reported to the Texas Transportation Commission in April 2009 that motor fuel revenue was 3% below the previous year's level. The 3% decline represents an 8% decline in diesel tax and 1.25% decline in gas tax receipts. This decline is most likely due to the nationwide recessions. The TRENDS model does not account for nationwide or global recessions as a factor in developing revenue estimates. Therefore, based on current recession impacted actual receipts, the revenue forecasts documented in this report should be considered optimistic.

Summary of Findings

Financial Forecast with No Enhancements

Through the year 2019, only a scenario with a very of the high population growth equal to that experienced in the 1990s and sustained through 2030 would provide some meager funds for mobility projects. It is important to note that this scenario also requires an optimistic federal rate of return combined with the least likely increase in fuel efficiency. Other more likely scenarios with more reasonable population and fuel efficiency projections result in not being able to support funds for mobility projects through 2019 and a declining level of maintenance quality

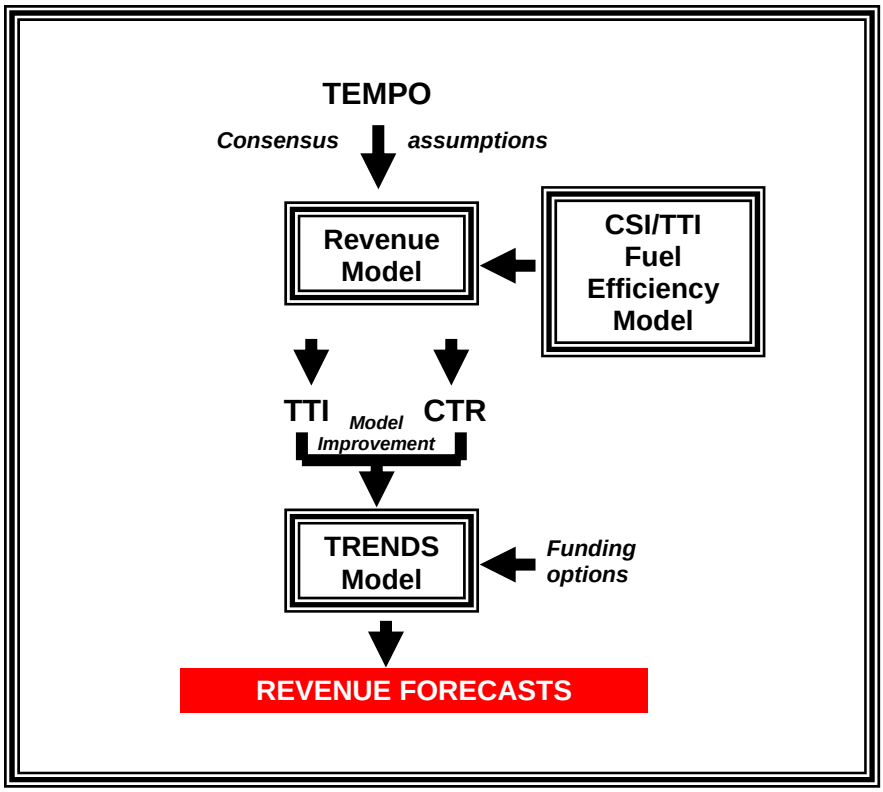
Current studies of maintenance quality show that with current funding allocations, maintenance quality statewide will decline more than 10% by 2012. This study was conducted by the Center for Transportation Research at the University of Texas analyzing the state's four year pavement management plans for each district. The following chart shows the "standard" forecast with current fees, tax rates, and with the "middle-of –the-road" fuel-efficiency assumption.



Looking beyond 2019 to the year 2035, every scenario reviewed by the workgroup projected that insufficient funds would be available to address any mobility needs beyond 2019. Furthermore, each scenario revealed that substantial cuts in preventative maintenance, in excess of 10%, would be necessary without any major policy changes resulting in revenue enhancements.

The TEMPO Workgroup Revenue Forecasting Process

As noted by both the Sunset Commission and the State Auditor's office, there was a general lack of consistency among Texas' Metropolitan Planning Organizations in terms of their assumptions and methodologies in producing their long-term transportation plans. This inconsistency in turn reduces the utility of a statewide plan encompassing the MPO plans.



To address this situation the TEMPO workgroup produced a consensus framework of assumptions fundamental to a long-term revenue forecast. The workgroup then reviewed various existing financial models and settled on a spreadsheet-based model being used at TxDOT. With the assistance of TTI, this model was expanded and customized for use by the workgroup. A long-term fuel efficiency model originally developed by Cambridge Systematics Inc. was also augmented by TTI for use as a submodel. The result was a financial forecasting model named TRENDS (*Transportation Revenue Estimator and Needs Determination System)* that is usable for transportation planning activities statewide. Incorporating the consensus critical assumptions allows credible planning and "what-if" analysis.

Chapter 1

The State of Transportation Finance

Introduction:

Individuals can assess their near-term financial outlook by simply opening the checkbook and assessing their income, saving, and spending habits. But for state transportation officials and regional planners, developing a credible multi-decade financial forecast is nowhere nearly that simple. Planners must begin by examining the fundamental factors that determine the future of transportation finance:

1. Population trends,
2. Fuel consumption and efficiency,
3. Federal funding programs, and
4. Inflation and cost to maintain our existing system.

Chapter One of this report briefly examines each of these variables and assesses their influence on the future of transportation funding.

1. Growth Any Way You Look At It

Booming population will continue to increase travel in Texas

The Texas State Data Center (TSDC) is responsible for making forecasts of Texas' population. Due to the inherent uncertainties in long-term forecasts, the Center has made its projections in the form of scenarios. Following are the three used in this analysis:

One-Half 1990-2000 Migration (TSDC Scenario 0.5)

This scenario has been prepared as an approximate average of the TSDC 0.0 and the TSDC 1.0 scenarios. It assumes rates of net migration one-half of those of the 1990s. The reason for including this scenario is that many counties in the State are unlikely to continue to experience the overall levels of relative extensive growth of the 1990s. A scenario which projects rates of population growth that are approximately an average of the zero and the 1990-2000 scenarios is one that suggests slower (than 1990-2000) but steady growth.

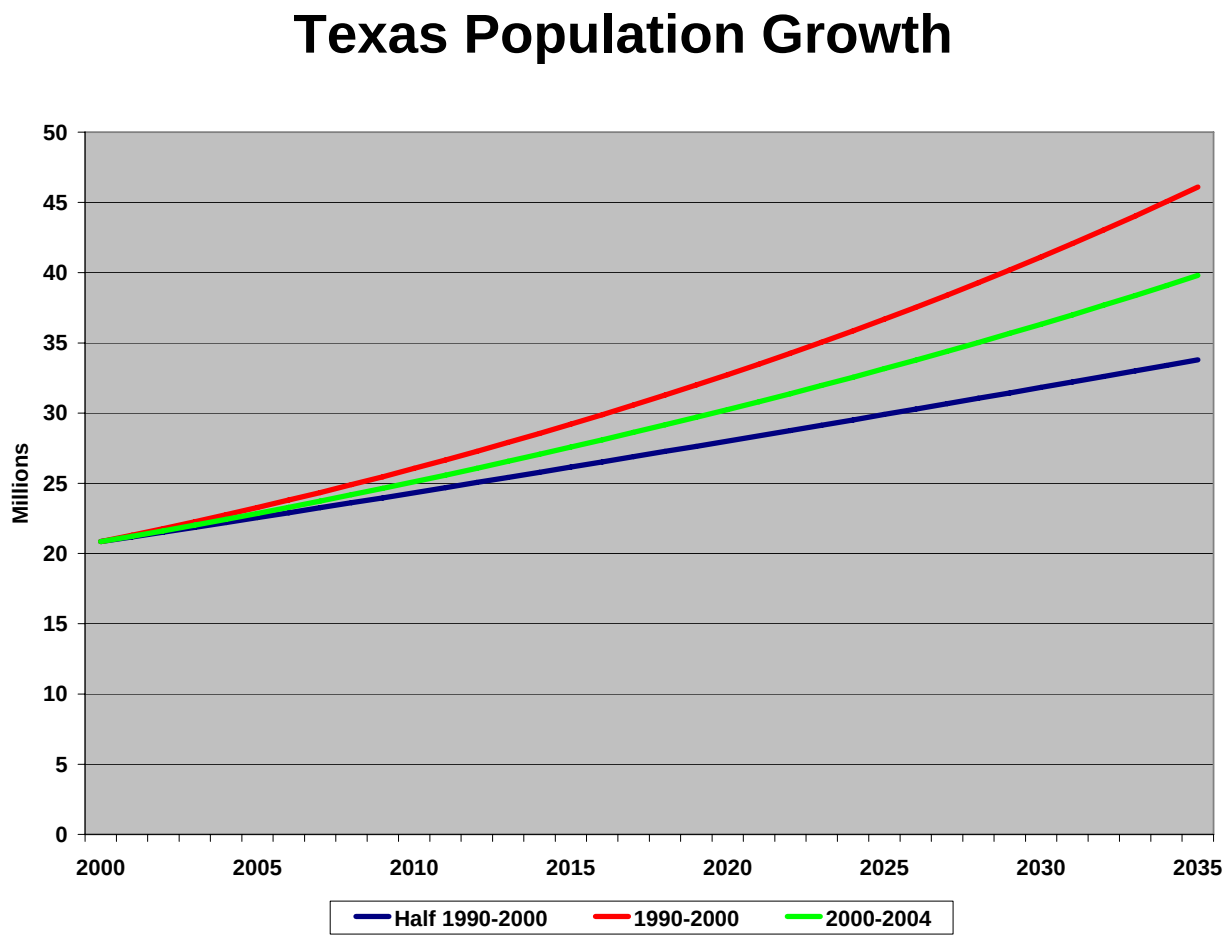
1990-2000 Migration (TSDC 1.0 Scenario)

This scenario assumes that the trends in the age, sex and race/ethnicity net migration rates of the 1990s will continue to characterize those occurring in the future. The 1990s was a period characterized by rapid growth. It is used here as the high growth alternative because its overall

total decade pattern is one of substantial growth (i.e., 22.8% for the 1990-2000 decade for the State).

The 2000-2004 Migration Scenario

The 2000-2004 projection scenario (not a TSDC scenario) is based on post-2000 population trends. Under this scenario the 2000-2004 demographics and specific migration rates are assumed to continue from 2000 through 2040.



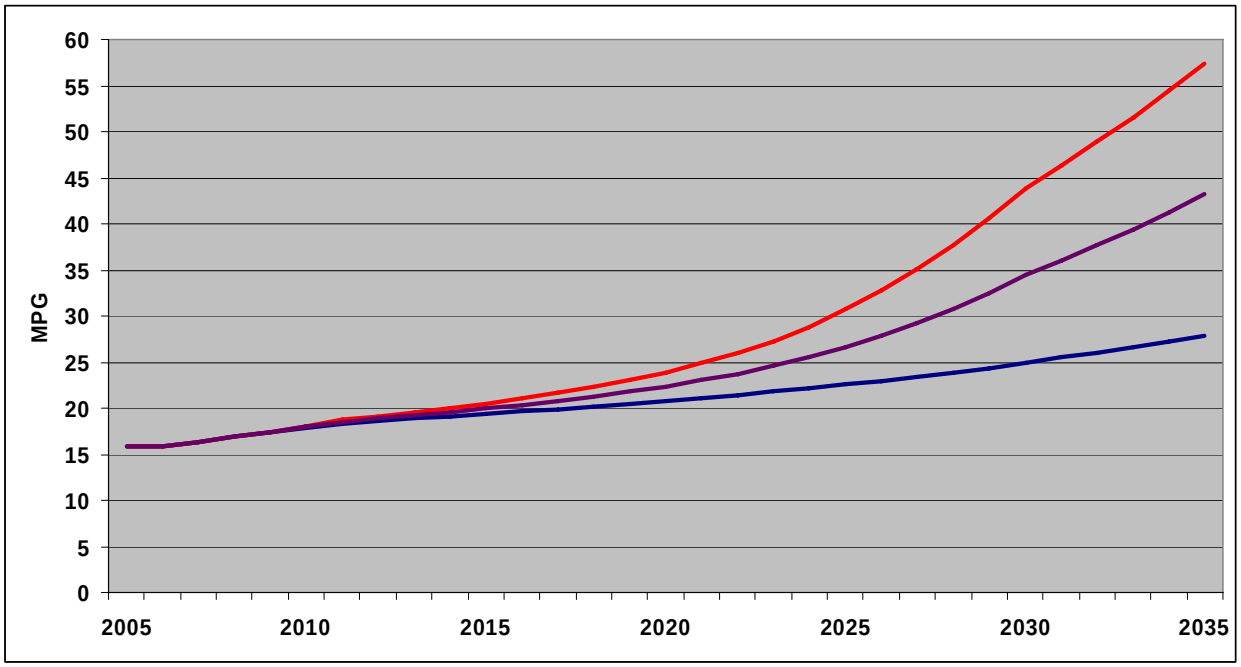
Which ever scenario ultimately comes to pass, the state is experiencing some degree of continued growth. Taken alone, this situation seems ideal, with increased fuel consumption leading to increased gas tax revenues available for the additional needed transportation projects. However, when taking into account the prognosis for increased motor fuel efficiency, the outlook changes completely.

2. Problems at the Gas Pump

Fuel efficiency technologies compromise the adequacy of gas tax revenue

In a major study by Cambridge Systematics Inc, the outlook for the fuel efficiency of the Texas motor fleet was projected to 2030 (see Appendix A). In an article summarizing this study in the November 2008 issue of Public Roads, "Higher Gas Efficiency Equals Lower Fuel Revenues," the author argues that a "perfect storm of political, technological, and market factors are converging…" and forever altering the outlook of fuel tax revenues.[1] Politically, America's increased dependence on foreign oil is leading government officials to call for both increased CAFÉ standards for fuel efficiency and increased financial incentives for the purchase of hybrid vehicles.[2] Combined with rapidly developing new technologies, and increased oil costs, these political changes result in an increased demand for fuel efficient vehicles. And manufacturers are responding. For example, JD Powers and Associates estimates that 30 or more hybrid vehicles will soon be released into the market.[3]

Fuel Efficiency Scenarios in TRENDS



The Cambridge model was further modified by researchers at the Texas Transportation Institute to better represent the future Texas motor fleet, and this was incorporated as a submodel into the TRENDS model for use by the TEMPO workgroup. It should be noted that the longer-term forecasts include an increasing number of hybrid-electric, pure electric passenger vehicles, and diesel light-duty trucks.

[1] Hagquist, Public Roads, "Higher Gas Efficiency Equals Lower Fuel Revenues"
[2] Hagquist, Public Roads, "Higher Gas Efficiency Equals Lower Fuel Revenues"
[3] www.Techcast.com

The Cambridge study, examining the Texas consequences of increased fuel efficiency and increased population, determined that "long-term growth in driving will be overtaken by the increases in fuel efficiency, resulting in lower fuel usage and therefore lower state fuel tax revenues." With a fuel efficiency of 34 mpg in 2030 (currently at 17 mpg), the state of Texas would receive less in State motor fuel tax revenue than it does today even with an increase of 12.5 million new Texans on the roads.

3. A Weaker Link

Federal funding is becoming ever less reliable

The financial challenges posed by rapid travel growth and increased fuel efficiency are compounded by the increasing uncertainty in federal transportation programs. In July 2006, the US Chamber of Commerce estimated that the Highway Trust Fund (HTF) will run out of money in 2010, and suggested approximately $1 trillion in additional funds is needed to improve the transportation system. As of September 2008, Transportation Secretary Mary Peters said the trust fund would be out of money *by the end of the month*, prompting Congress to pass a bill that shifted $8 billion from the US Treasury's general fund to the highway trust fund to restore solvency to an account that was going broke.

Simply put, there is an unreliable link in the system of transportation finance. The success of the state-federal partnership, established by the Federal-aid Highway Program in 1917, is, like other relationships, based largely on trust. Created by both the US Department of Transportation and the US Congress, the Highway Trust Fund (HTF) is the financing mechanism through which the federal government collects and distributes federal motor fuel tax revenues. Because the HTF is under the direction of USDOT and Congress, it is subject to their will. Instead of solely dedicating the Highway Trust Fund to transportation projects, legislation, reauthorization, discretionary programs and demo projects allow federal officials to re-distribute motor fuel tax revenues as they see fit.

The depletion of the Federal Highway Trust Fund will in the long run be compounded by the penetration of fuel efficient technologies into the motor fleet. Unless new revenue sources are identified to bolster the declining buying power of motor fuels tax revenues, the Highway Trust Fund will not be able to adequately support future investments among the state departments of transportation.

4. A Dollar's Just Not What It Used to Be

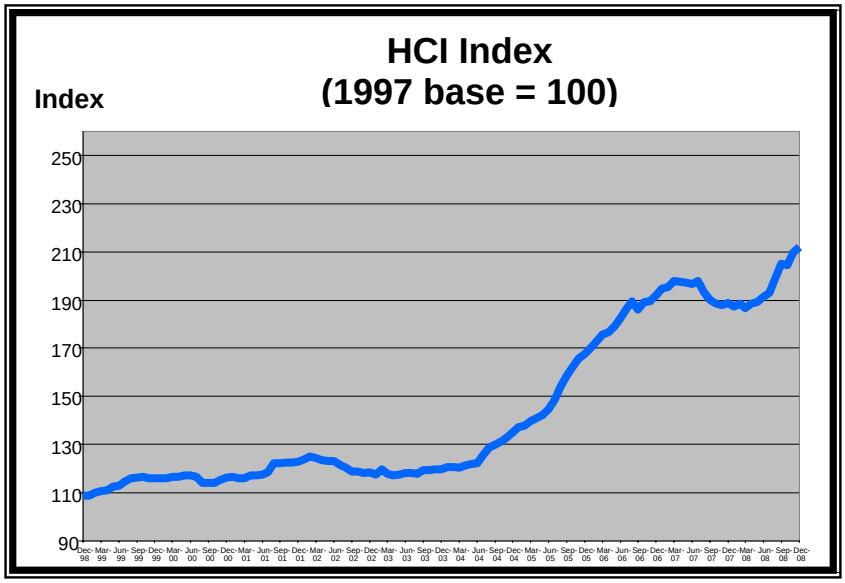
Inflation decreases the buying power of the transportation investment dollar

The Texas highway system is known as being one of the best designed and maintained systems in the nation; that did not happen by accident. Transportation engineers know that every $1 invested in preventive maintenance results in $6 of future costs, a substantial savings in the long run. Recognizing the significance of this savings, in 2001, Texas Transportation Commissioner Johnson tasked state transportation organizations with ensuring that 90% or more of existing

Texas roads were in “Good or Better” condition by the year 2012. Transportation officials responded to this by increasing investment in preventive maintenance and rehabilitation projects. As a result, 87% of Texas roads are in “Good or Better” condition (up from 80%). However, this condition is not likely to continue for financial reasons.

The dollar is just not what it used to be, particularly for road construction. Highway cost inflation has skyrocketed by 62% over the last 5 years. This is shown in the graph below. The graph begins with December 1998 and ends with December 2008.

In addition, the increased traffic that has accompanied our state’s population boom is putting more wear and tear on our roadways. In order to keep up with the rising costs of maintenance, Texas transportation officials have been forced to cancel mobility projects, and shift approximately $1.06 billion available mobility funds to maintenance projects. In addition, transportation officials are expanding the use of preventive maintenance and expanding the use of products which reduce material costs— all as a means of stretching available maintenance funds.



State officials estimate that an additional $6.3 billion in funding will be necessary to meet the 90% “Good or Better” goal by 2019. But solely rely on stretching the maintenance budget, only 80% or Texas roads will be in “Good or Better” condition by then. That is 7% below the current condition (see Appendix B).

Chapter 2

Parameters and Assumptions in the Financial Forecasts

Introduction

A 2008 study by the State Auditor's Office (SAO) found that there was insufficient uniformity among the Metropolitan Planning Organizations in estimating future revenues within their Metropolitan Transportation Plans (MTP). Additionally, the SAO found that there was great inconsistency among the assumptions made for the basic parameters used in estimating future transportation needs in the metro regions. It concluded that MTPs must be generated with consistent assumptions to allow any meaningful aggregation of their numbers, for example estimating statewide needs.

In the spirit of the SAO recommendation, TEMPO assembled a team of their transportation planners to make a joint consensus estimate of state and federal transportation funding through 2035. In addition, the team was charged with producing mutually-agreed scenarios of feasible state and federal revenue enhancements. Put together, these would provide a full picture of the future of state transportation revenue, encompassing the full range of scenarios from "do nothing" to aggressive multiple revenue enhancements.

The analytical approach of the workgroup was to develop a "baseline" revenue forecast as a standard against which to compare alternative scenarios. Then high and low revenue scenarios were developed to better understand the sensitivity of the revenue prognosis to the underlying parameter assumptions.

The Basic Parameters for the Financial Forecast

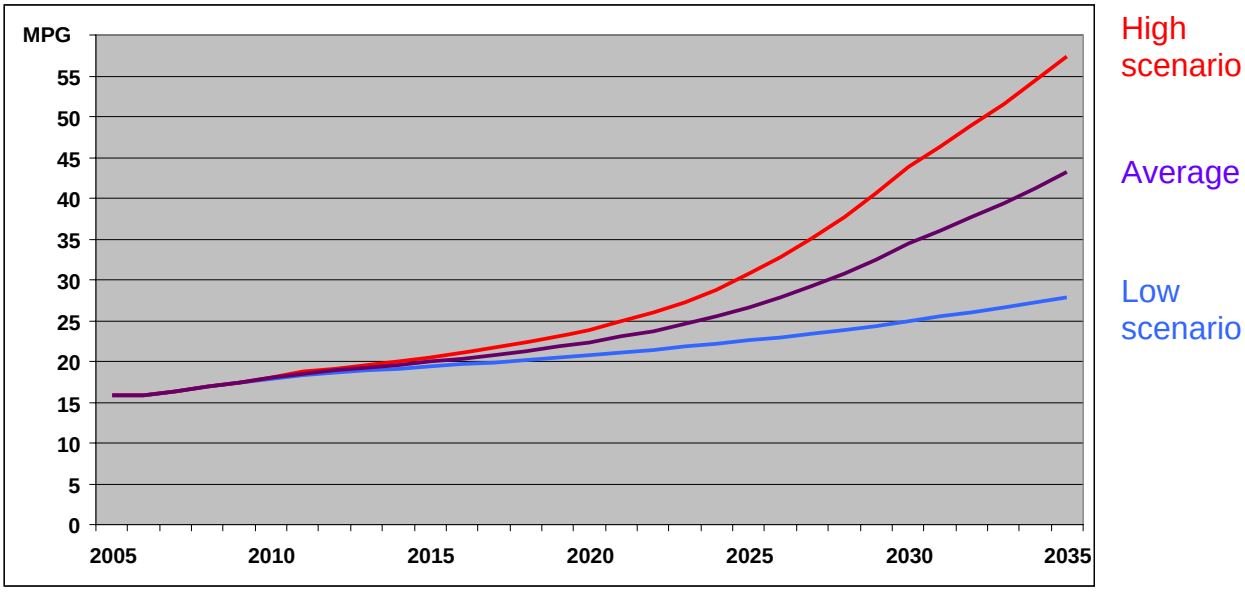
The workgroup first had to agree on the analytical model to be used for the project. They settled on a simple spreadsheet-based model developed at TxDOT which they then enhanced to meet their analytical needs which they named TRENDS (see Appendix D). The group performed numerous case runs with this model to determine which variables had the most impact on the long-term projection of state funds available for mobility expansion. These were found to be:

- Population
- Motor fleet fuel efficiency
- Federal Highway Trust Fund revenues to Texas
- UTP Category 1 - 12 programmed amounts
- Payments on existing projects
- Non-construction expenses
- Proposition 12 funds received
- Cost to maintain roads "good-or-better"
- Proposition 14 bond repayments

For each of these input parameters, the workgroup reached consensus on reasonable upper and lower limits, along with a most-likely intermediate value. A discussion of each of these parameters follows.

Population: The group decided that the best lower limit was the 0.5 Scenario of the Texas State Data Center, which assumes half the rate of in-migration of the previous decade. Likewise the upper limit chosen was the 1.0 TSDC Scenario, which has the same rate of in-migration as the prior decade. The intermediate value chosen was the state growth rate during the period 2000 to 2004.

Motor fleet fuel efficiency: In 2007 a fuel efficiency model was built by Cambridge Systematics Inc. to project Texas fleet efficiency to 2030, as a function of likely technological and market developments. Using this model, TTI researchers determined that the likely range of values in 2030 was from 24.9 mpg to 43.9 mpg, with an average value of 34.4; the current fleet efficiency in Texas is 16.9. The year-to-year mpg numbers prior to 2030 were interpolated from the high and low scenarios.



Federal rate of return to Texas: Texas is a **"**donor" state in that it does not get back all the Federal fuel taxes collected in the state, a situation that will not change without a major (and unlikely) change in Federal legislation. The "rate of return" is the percentage of collections that Texas gets back. This "rate of return" has varied greatly. Over the last ten years, the rate of return was as low as 47 cents on the dollar to as high as 117 cents on the dollar. As new federal bills are written, there is a high probability that Texas' reimbursement will change again. An average reimbursement amount of 85% was chosen. This amount is the average reimbursement Texas has seen in the last ten years. The group held this rate constant for all scenarios.

TxDOT Funding Category 1-12 programmed amounts: The group estimated these would be a constant $28.18 Billion among the scenarios, based on TxDOT target funding levels for 2009-2019 presented to the TxDOT Commission in April 2008. For the time period, 2020-2035, estimated programmed amounts total $42.04 Billion.

The assumptions for the estimated programmed amounts for 2020-2035 are:
Category 1 – amount spent is the same as in 2007.
Categories 2-4 – no funds available
Categories 5-11 – amount programmed in 2019 are held constant throughout period
Category 12 – no funds available

Target Funding Levels (2009-2019)

1. Maintenance	$12,426,727,838
2. Metro Mobility	3,269,000,000
3. Urban Mobility	433,000,000
4. Statewide Mobility	801,500,000
5. CMAQ	1,634,579,254
6. Bridge	2,750,000,000
7. STP- Metro Mob/Rehab	2,351,000,000
8. STP – Safety (HES)	1,430,000,000
9. STP – Enhancement	660,000,000
10. Miscellaneous	639,000,000
11. District Disc.	687,500,000
12. Strategic Priority	1,096,430,200
Total Contracts	**$28,178,737,292**

Payments on existing projects: The group estimated these would be a constant $2.12 Billion among all scenarios. This amount is based on projects that have already let to construction and will payout over the next three years.

Non-construction expenses: The group estimated these would be a constant $48.65 Billion from 2009-2019 among the scenarios, based on historical expenditures. For 2020-2035, non-construction expenses would total $106.74 billion assuming a 5% per year increase in expenses.

Proposition 12 funds received: Proposition 12 gave TxDOT the authority to issue transportation bonds to be paid back from the General Fund of the state. The group chose to assume that no funds would be forthcoming since despite authorization being provided by the voters, there is not currently any precedent for the state using general fund backed bonds to provide funds for transportation.

Cost to maintain X% of roads "good-or-better": The group assumed that the most likely strategy would be to let the roads decline from the current 87% "good or better" and then recover to that condition by additional funding beginning in 2020.

Proposition 14 bond repayments: Proposition 14 gave TxDOT the authority to issue transportation bonds to be repaid by future fuel tax revenues. The group believed that $3.0 billion was the most likely amount in all scenarios.

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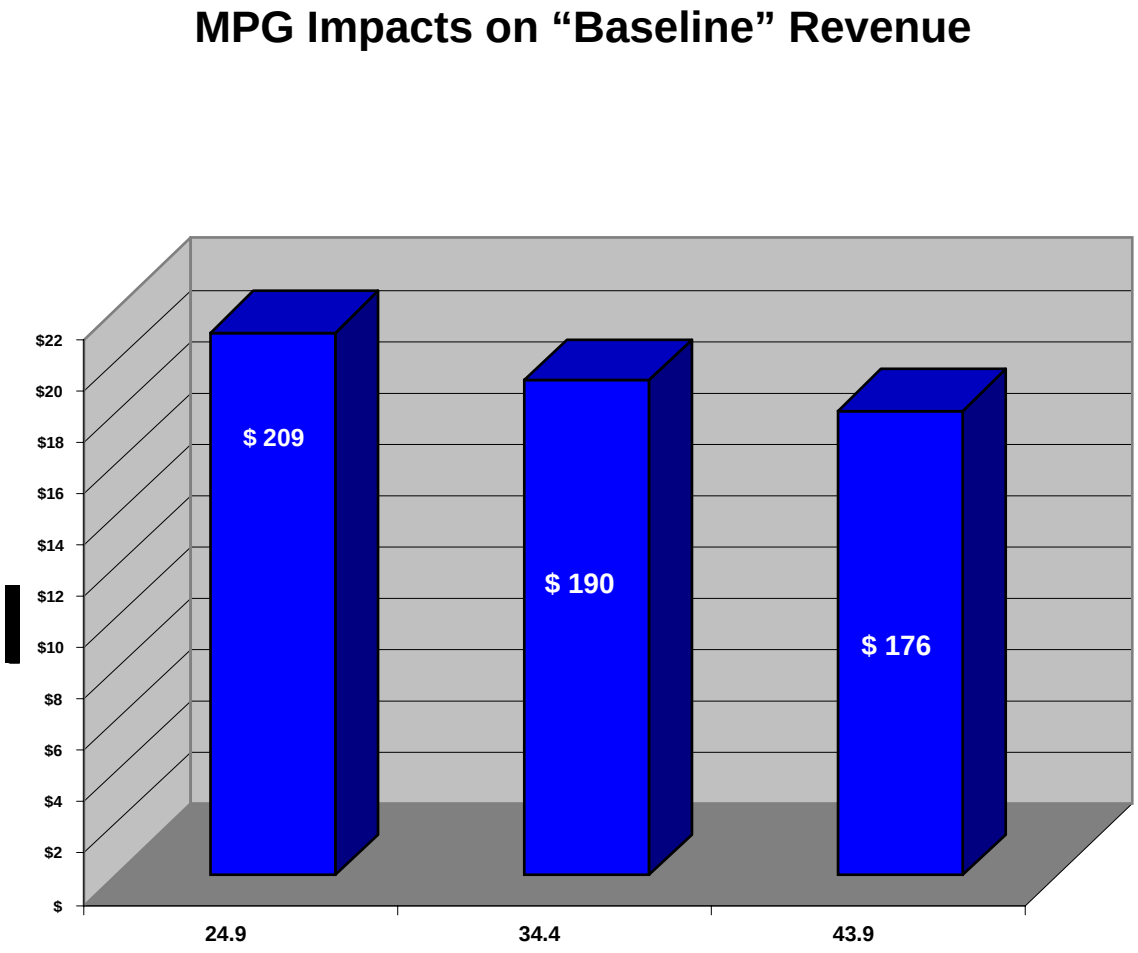
Key Assumptions & Parameters:

The following table summarizes the consensus of the TEMPO workgroup for the values of the four critical parameters to be used for generating the base "standard" revenue scenario and the two most-likely higher and lower scenarios.

	SCENARIOS		
	LOW REVENUE	**"STANDARD" REVENUE**	**HIGH REVENUE**
Population	State Data Center's 0.5 scenario	Growth rate of 2000-2004	State Data Center's 1.0 scenario
Fuel efficiency in 2030 (CSI / TTI)	43.9 mpg	34.4 mpg	24.9 mpg
Federal rate of return back to Texas	Stays the same	Stays the same	Stays the same
Proposition 14 received In Billions	$3.0	$3.0	$3.0

The fuel efficiency parameter is the most significant single variable in generating the forecast of future transportation revenues. The following chart shows the variation in the Base forecast depending on the fuel efficiency scenario:

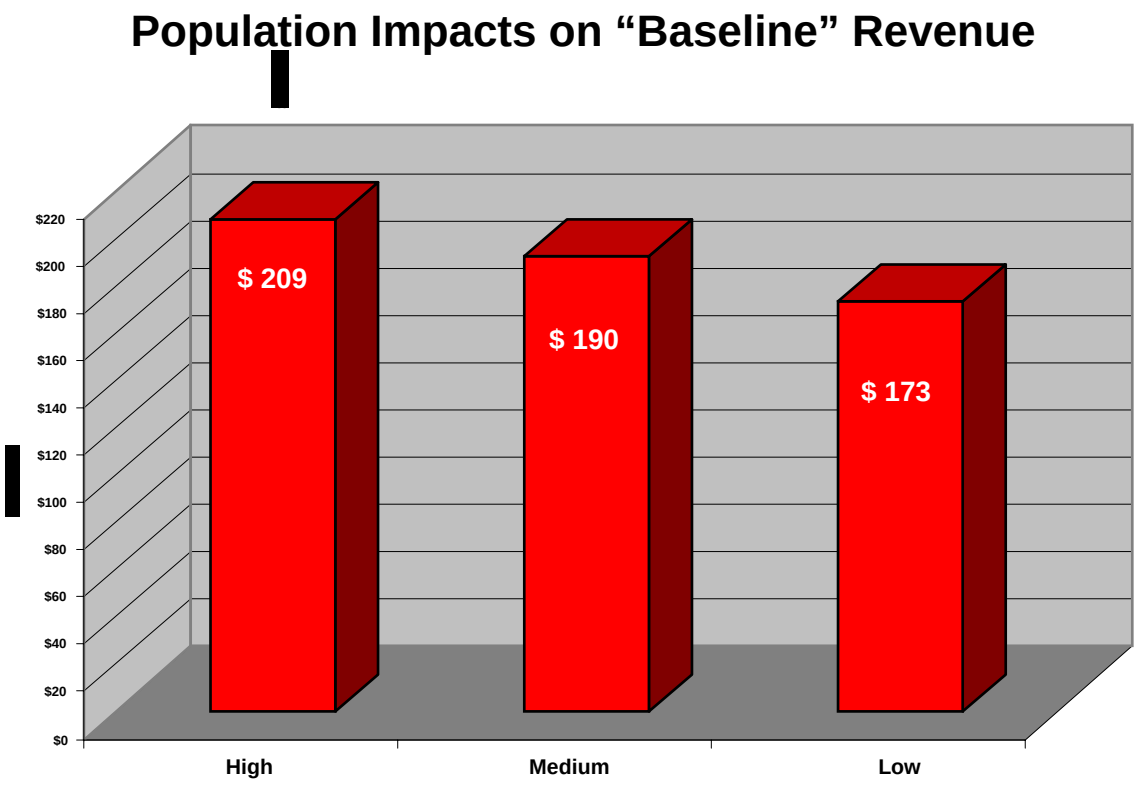


The 24.9 mpg and the 43.3 mpg scenarios represent the probable lower and upper limits of the TRENDS fuel efficiency submodel forecast. These scenarios represent the joint effects of low technological progress/ low market penetration and high technology/ high market acceptance, respectively. It is notable that the median scenario of 34.4 mpg is *more than double* the 2008 value of 16.9 mpg.

Total Revenue 2009-2035 for above the scenarios:

With MPG = 24.9, Revenue = $208.8B ($165.4B for 2009-2030)
With MPG = 34.4, Revenue = $190.0B ($155.1B for 2009-2030)
With MPG = 43.9 Revenue = $178.6B ($147.8B for 2009-2030)

While the population variable is also important to the revenue forecast, it should be remembered that the *increase in revenues from population increase is largely absorbed* by the corresponding increase in demand for transportation investment due to the increased traffic.



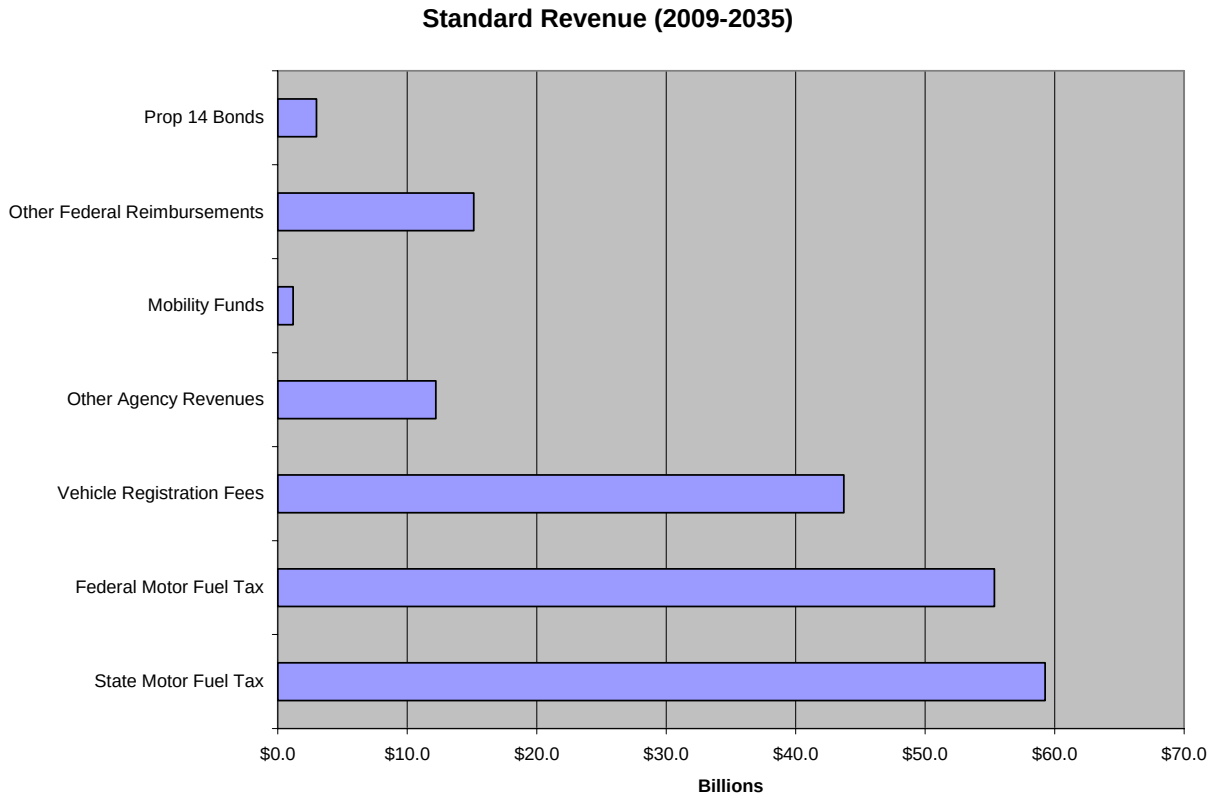
Total Revenue 2009-2035 for above the scenarios:

With High Growth, Revenue = $209.4B ($169.0B for 2009-2030)
With Medium Growth, Revenue = $190.0 B ($155.1B for 2009-2030)
With Low Growth, Revenue = $173.3 B ($143.7B for 2009-2030)

Chapter 3

Financial Forecasts Without Enhancements

The components of the standard forecast total $ 190 billion over the whole time period (2009-2035):



Analysis Summary: No Enhancements

Through the year 2019, only the high scenario projected that any funds would exist for mobility projects. It is important to note that the high scenario estimated the most aggressive population growth and federal rate of return forecast and combined this with the least aggressive increase in fuel efficiency. All other scenarios estimate that no funds will exist for mobility projects through 2019 and that even reducing the maintenance goals to 80% good or better may be optimistic.

Looking beyond to the year 2035, every scenario reviewed by the workgroup projected insufficient funds would exist to address any mobility needs beyond 2019. Furthermore, each scenario suggested that substantial cuts in preventative maintenance would be necessary without any revenue enhancements.

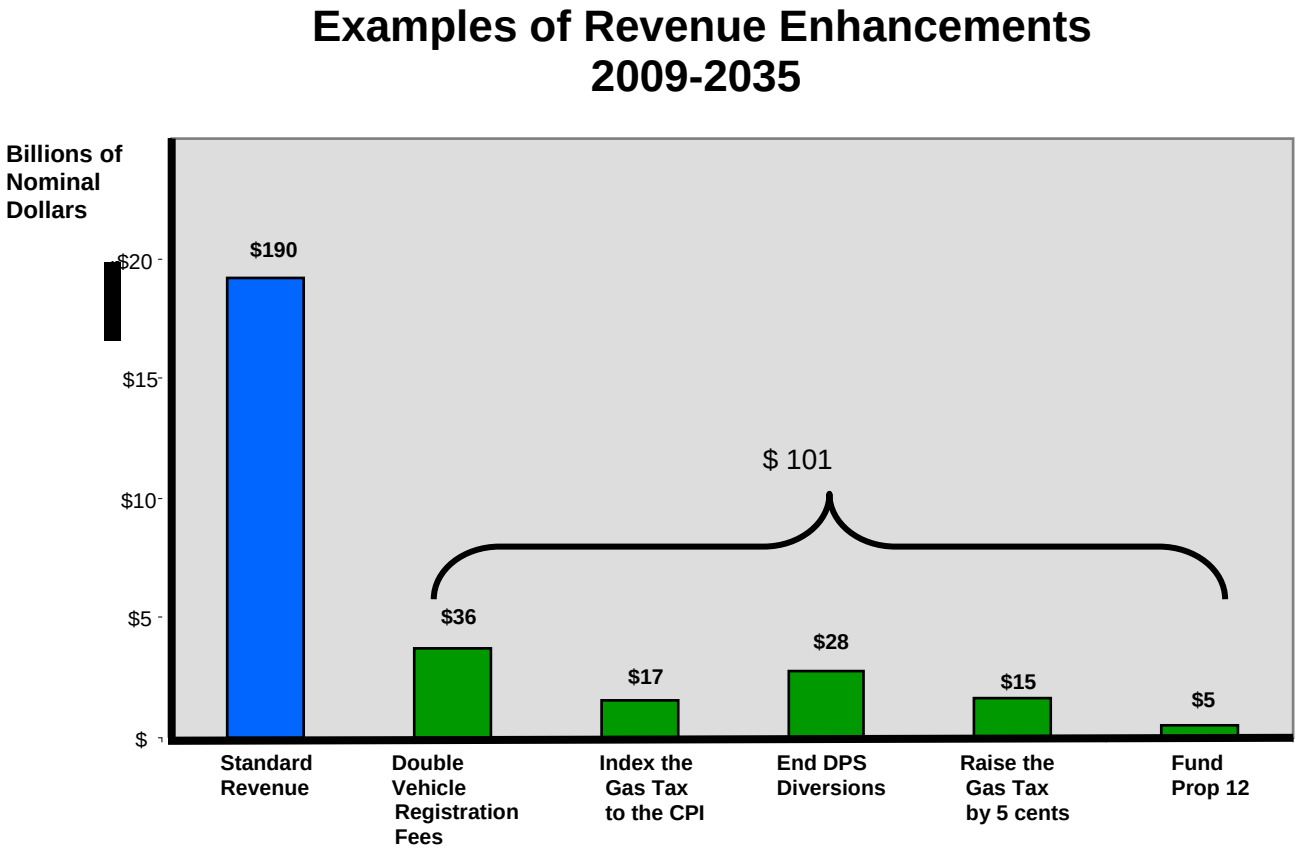
Chapter 4

Revenue Enhancements

The Basic Assumptions for the Revenue Enhancement Forecast

The group settled on examining a number of examples of potential enhancements to the current revenue stream going into transportation investment in Texas.

Through 2019 each scenario indicates that modest revenue enhancements would provide sufficient funds for at least some mobility projects. It is important to note, however, that baseline scenario assumes that a significant amount of maintenance will be deferred through 2019 resulting in significant maintenance cost increases afterwards. The following chart summarizes the relative contributions of various enhancements with the standard revenue forecast for comparison in the longer term:



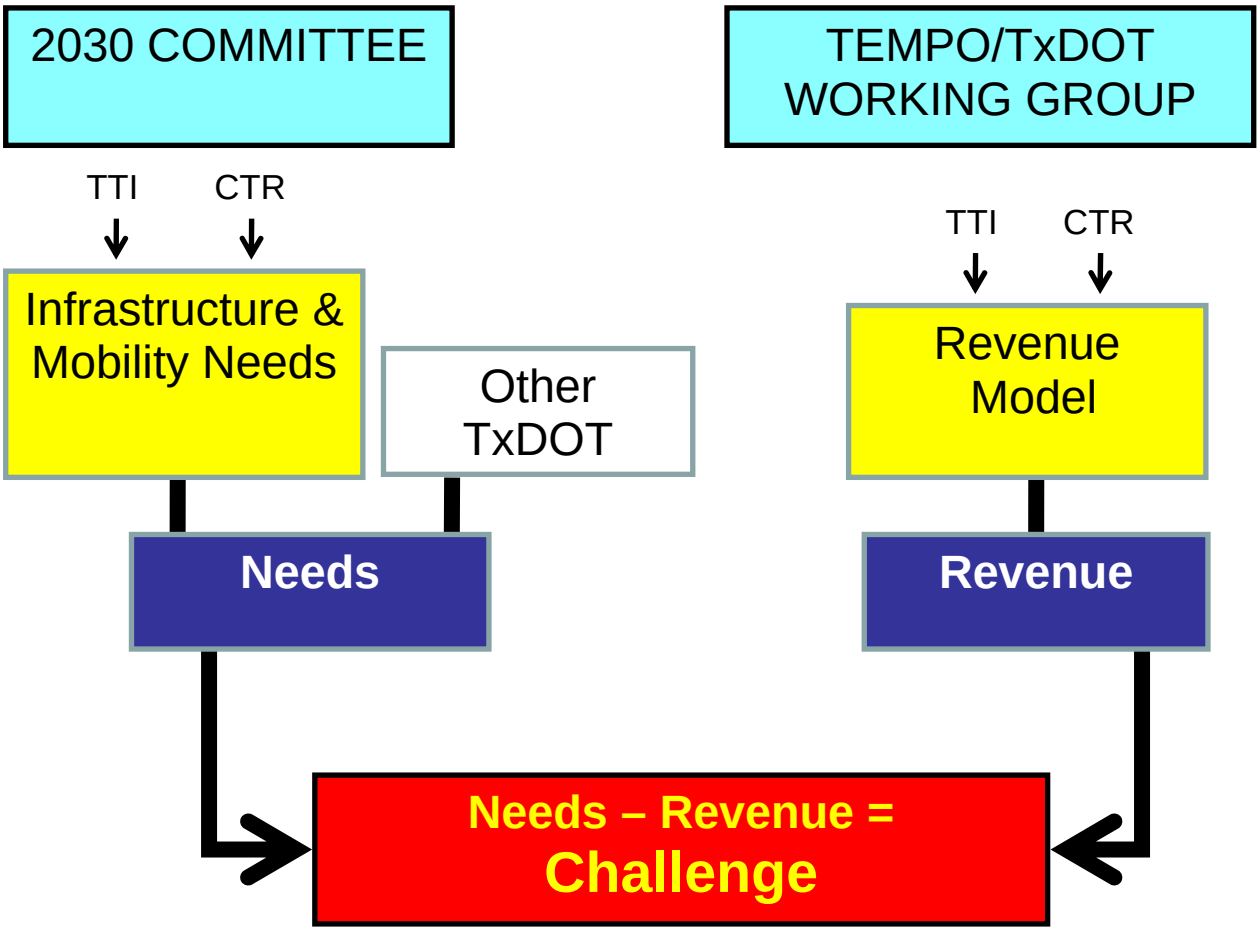
Assumption: All enhancements are enacted in 2010.

If all the example revenue enhancements are implemented, this yields about an extra $3.8 billion per year over the 26-year time period. Policymakers will have to decide how to use these funds to address the challenge of the $488 billion of transportation needs discussed in the next chapter.

Chapter 5

Defining The Challenge

As stated at the outset, the revenue forecasting effort was half of a two-pronged effort to determine the extent to which future needs could be met with current financing mechanisms, taxes, and fee structures. The following chart describes the overall effort:



The two efforts were conducted separately but on the same time frame (to 2030) and their results were then put on the same nominal dollar basis to allow correct comparison of needs and revenues.

The chart below summarizes the findings from the 2030 Committee research into the various components of state needs through 2030. The effects of inflation (4%) over this extended time period are also depicted:

2030 Report - Estimated Need
Adjusted for Inflation & State Share of Needs

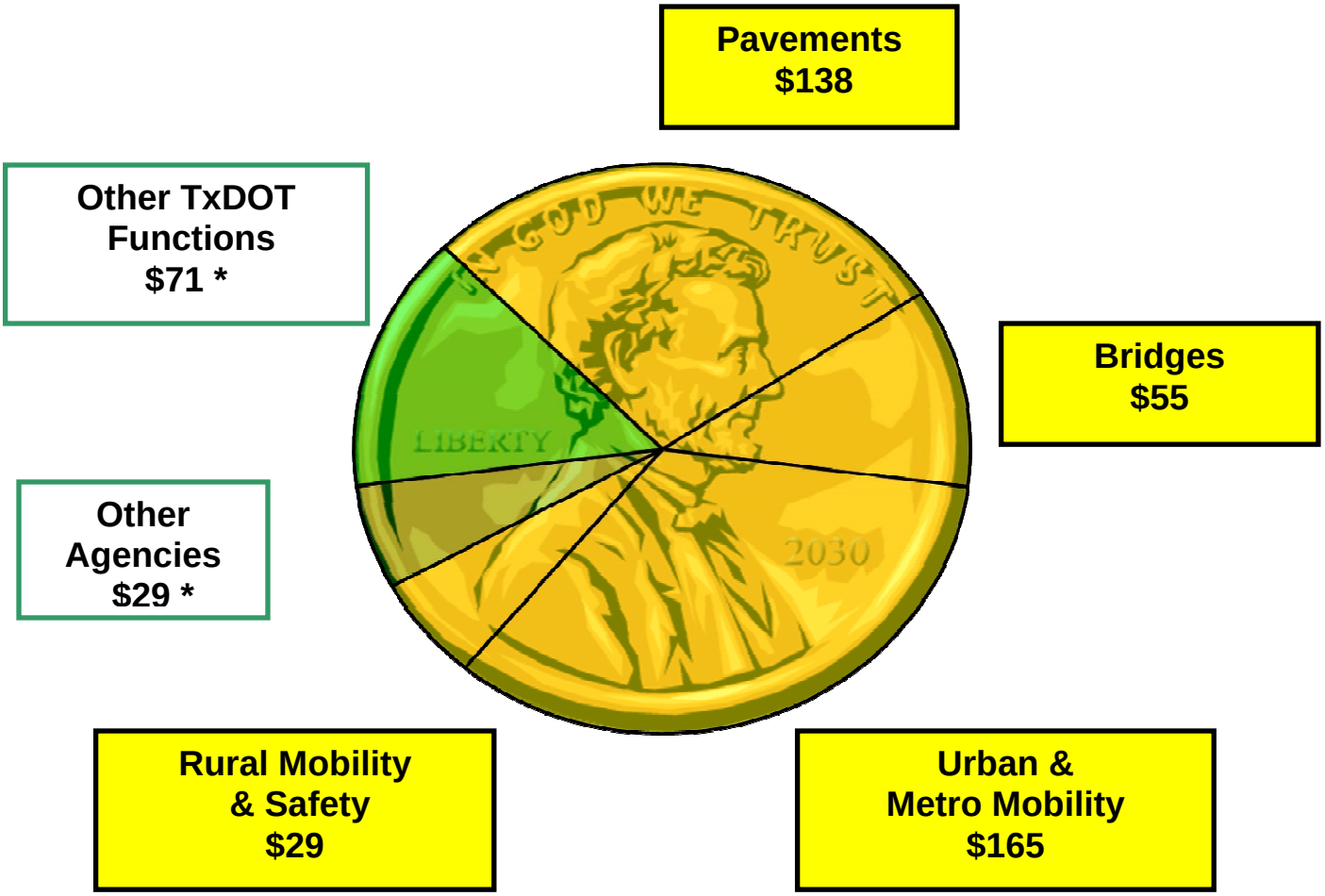
	Constant 2008 Dollars	Inflation Adjusted	State Share
2030 Total Investment Needs	**Billions**	**Billions**	**Billions**
Pavements	$ 89	$138	$138
Bridges	$ 36	$ 55	$55
Urban Mobility *	$171	$266	$165
Rural Mobility & Safety	$ 19	$ 29	$ 29
Total	**$315**	**$488**	**$387**

One way to look at the picture is on an annual basis. Projected "business as usual" revenues (the "standard" forecast in the earlier chapters) amounts to $7.3 billion annually over the time horizon, and all the examples of revenue enhancements taken together add another $3.8 billion. However, the $387 billion state share of needs is over $18 billion annually.

Adjusting the 2030 Committee's estimated need numbers for inflation converts them into "nominal: dollars, allowing them to be directly compared to the TEMPO workgroup's revenue numbers. Doing so, it is clear that the challenge for policymakers will be how best to address the (average annual) funding gap that is expected between $7.3 billion of revenue and $18 billion of transportation needs.

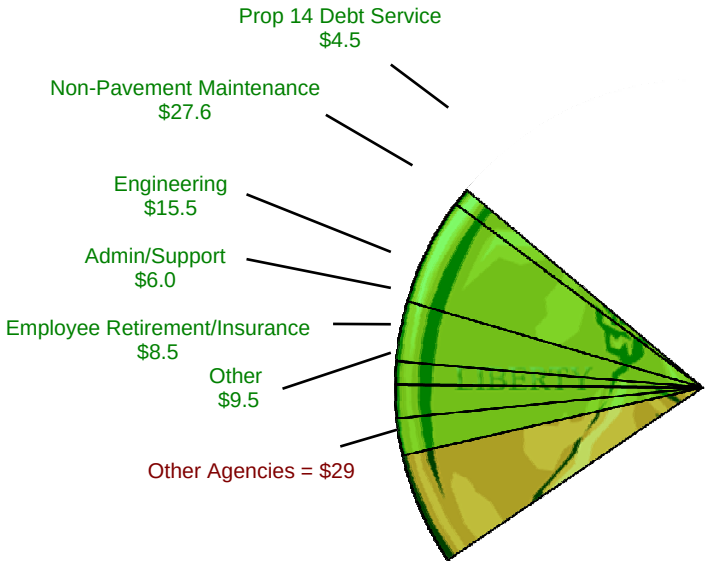
* Historically, 2/3 of the urban mobility investment has been by the State and 1/3 by the respective urban areas.

Components of Needs Forecast
$ 487 Billion (Inflation Adjusted)



* "Other TxDOT Functions" and "Other Agencies" amount to $100 billion of encumbrances in the sense that these are unavoidable "keep the lights on" commitments and legal requirements.

Non-2030 Expenses
(Inflation Adjusted)



Other TxDOT Functions	...ions
Short Term Borrowing	$0.22
SWCAP	$0.04
Auto Theft Prevention Agency	$0.47
Vehicle Registration	$2.26
Travel & Traffic	$1.79
Aviation & Motor Vehicle	$2.38
Pass Through Tolls	$1.41
Toll Equity	$0.16
Research	$0.75
Employee Retirement & Insurance	$8.51
Administering the Program/Support	$5.97
Engineering	$15.46
Gulf Intercoastal Waterways & Public Transportation	$2.77
Ferry	$0.79
Contract Routine Maintenance (Non-pavement)	$10.76
In-house Maintenance (Non-pavement)	$13.27
Proposition 14 Debt Service	$4.45
Total	$71.47

Other Agencies	in Billions
DPS	$21.34
HHS/TDC	$6.17
Atty. General	$0.26
TERP	$0.74
Total	$28.50

The Challenge Summary
(2009-2030 In Nominal dollars)

• TEMPO Estimated Revenue	$ 155 B
Less:	
• Mobility & Pavement Needs (State Share)	- $ 387 B
• Encumbrances	- $ 100 B
Equals:	
The Challenge	**- $ 332 B**

APPENDIX A

Accounting for Fuel Efficiency in Texas Fuel Tax Revenue Estimations

final report
prepared for
Texas Department of Transportation
prepared by
Cambridge Systematics, Inc.
100 CambridgePark Drive, Suite 400
Cambridge, Massachusetts 02140
January 2007

http://www.camsys.com/pubs/TXDot_GBE.pdf

APPENDIX B

CHOICES

A Report In Support of the Development of the Proposed FY 2009 -FY 2019 Unified Transportation Program

Prepared by:
John Barton, P.E., Assistant Executive Director for Engineering Operations
James Bass, Chief Financial Officer
David Casteel, P.E., Assistant Executive Director for District Operations

Submitted to:
Steve Simmons, P.E. Deputy Executive Director and Chief Operating Officer
Texas Department of Transportation
Austin, Texas
April 3, 2008

Executive Summary

The Texas Department of Transportation's currently approved Statewide Transportation Improvement Program (STIP) must be updated to comply with current federal planning regulations. In order to address the financial constraint requirements for developing the STIP a new Unified Transportation Plan (UTP) must be adopted by the commission to establish the funding levels available for the development and construction of highway projects over the next ten years. Staff prepared an estimate of projected revenues based on reasonable assumptions and trends, and determined anticipated expenses related to outstanding debt and contractual obligations, project development needs, routine operating costs, and other expected expenses to calculate the resultant projection of available funding for highway construction and maintenance contracts for fiscal years 2009 through 2019. This value is estimated at $28.2 billion for the next 11 year period.

Estimates of contract funding needed for existing strategic priority commitments, future bridge maintenance, safety projects and other required program expenditures total $10.8 billion over this 11 year period. This leaves a remaining balance of $17.3 billion to be divided between roadway pavement maintenance/rehabilitation and congestion relief projects.

Deferring needed pavement maintenance can lead to increased major rehabilitation costs later on and can result in safety concerns due to poor pavement quality and conditions. Deferring the construction of congestion relief projects can result in increased user delays, loss of economic opportunity, poorer air quality, and increases in vehicle crashes.

The calculated balance of available funding to be divide between pavement maintenance/rehabilitation projects and mobility projects for congestion relief is not enough to meet the needs of either demand, much less both.

Hard choices must be made weighing the costs and benefits of any such funding split. Staff is recommending that from the funds available, $12.4 billion be used for pavement maintenance/rehabilitation and the remaining $4.9 billion be dedicated to mobility projects for congestion relief.

This report explains the rationale behind this recommendation. It also contains the following additional information:

- A listing of assumptions along with detailed computations of expected revenue and expenses to compute the funding available for maintenance and congestion relief projects can be found in Appendix A.
- An analysis of the potential impacts of available bonding is found in Appendix B.
- A recommendation for use of potential bonds is found in Appendix C.
- The Recommended 2009-2019 Unified Transportation Program Categorical Funding Allocations are found in Appendix D.
- Specific responses to Commissioner Houghton's questions of March 31, 2008, are found in Appendix E.
- A listing of current pavement quality assessments by districts is included as Appendix F.
- A Metropolitan Area estimation of leveraging of mobility allocations from this recommendation is found as Appendix G.
- A summary of the analyses that were performed to quantify the financial impacts of funding pavement preventive maintenance and rehabilitation at the levels recommended by staff is contained in Appendix H.

Overview of Recommendations

Staff is recommending a split of the $28.2 billion in available funding for contracting to follow these guiding principles:

1. Meet Federal and State requirements for sub-allocations into certain categories. These categories include the Surface Transportation Program for Safety, Congestion Mitigation and Air Quality program, and allocations to the metropolitan planning organizations' and districts' discretionary programs. ($7.4 billion)

2. The bridge rehabilitation and replacement program must meet minimum federal funding levels and has been established at a level sufficient to improve the condition of the state's bridges so that no bridges are critically deficient and that 90% of all of the state's bridges are in good or better condition by the 2012. To meet these goals and requirements we must provide $250 million per year for this program. ($2.75 billion)

3. Fulfill previous strategic priority commitments that are supported by executed minute orders. ($0.696 billion)

4. Meet the Preventive Maintenance Needs of the roadways of the state . ($8.5 billion =$0.633B inflated at 4% for 11 years)

5. Fulfill the previous 2004 allocations of Texas Mobility Funding made to the metropolitan Planning Organizations (MPOs). ($1.6 billion)

6. Fulfill 80 percent of the 2004 allocation of the Category 2 Metropolitan Mobility Funding to the eligible large MPOs. ($1.7 billion)

7. Treat the smaller MPOs proportionate commensurate to the large MPOs in regards to mobility funding as outlined in 2004 allocations for Category 3, Urban Mobility Funding. ($0.433 billion)

8. Allocate funding at a reasonable level to address the most pressing anticipated rehabilitation needs of the state. ($3.9 billion =$12.4 B -$8.5 B for PM)

9. Assign the remaining funding for rural connectivity and strategic priority projects, Category 4 and Category 12 yet to be assigned respectfully. ($0.801 B + $0.400 B = $1.2 billion)

This recommendation is based on a reduction of mobility funding and maintenance funding from previously approved levels. The previously approved levels were not developed to reflect trends in revenue and non-contract expenditures as accurately and completely as were developed for the 2009-2019 UTP. The previously approved levels also intentionally provided over programming at a 20-25% level, and resulted in more projects being programmed than the forecasted funding will support.

Pavement Maintenance/Rehabilitation Funding Details

During the summer of 2007, a series of presentations were made to the Texas Transportation Commission providing a discussion of maintenance/rehabilitation needs in Texas.

Using data available at the time a conclusion was drawn that if the current pavement maintenance and rehabilitation practices continued, and the funds continued to be distributed and used as they were, it would take approximately $1.1 billion per year (in 2002 dollars) to be dedicated to pavement maintenance/rehabilitation to keep the quality Texas' pavements at about the same level they are today in future years. This conclusion was drawn by comparing actual spending in the pavement maintenance/rehabilitation category in three recent years to actual pavement quality assessments.

Adjusting for the past inflation we have measured since 2002, and for an anticipated future inflation rate of 4%, the $1.1 billion per year need (in 2002 dollars) projected over the 11 year period between 2009 -2019 calculates to be $23 billion.

The staff recommendation is to fund at a level lower than this computed value for three reasons.

1. The computed need is the best computation we can make based on real data, but is supported by only three years of data.

2. There are real needs in mobility that should be funded at some minimal level, and

3. Staff feels that we can better engineer maintenance/rehabilitation projects throughout the state and better allocate the funds across the state in a manner more consistent with real needs by dedicating more of the funding in the category to preventive maintenance and pavement rehabilitation than has been done in recent years .

For example, many projects are designed to geometric standards higher than is needed for pavement maintenance only, in effect using maintenance funding to upgrade geometric features such as vertical curves. In addition, pavement maintenance and rehabilitation funding is also used to construct and upgrade appurtenances such as curbs and sidewalks. The upgrading of geometric features and appurtenances reduces the amount of funding in this category for actual pavement maintenance and rehabilitation work. These upgraded features do not contribute to better pavement scores or assessments.

In addition, some areas of the state are already exceeding pavement goals for 2012, yet they have been receiving funding according to the same allocation formula for a long period of time. Staff feels that funding these areas at lower levels and concentrating on preventive maintenance is a better resource allocation and risk management approach. The funds reduced in these areas would be redirected to areas with greater unmet maintenance needs.

By funding at levels below the computed needs, we will be, in effect, forcing better allocation and engineering approaches to maintenance/rehabilitation. If we fund at levels closer to the computed needs, the necessity to improve is not as pressing. Constraints breed innovation. Placing constraints on maintenance/rehabilitation will produce innovation.

Already, district engineers are forming "maintenance peer review" teams to help those districts that are below standards to develop better programs and approaches. Staff feels this will result in more consistent approaches across the state and more pavement focused designs. District engineer performance plans have also been revised to reflect a desire to focus more on cost effective pavement maintenance.

In addition, staff will direct districts to develop maintenance/rehabilitation plans in-house rather than through outsourcing them to consultant engineers. It is felt that this will result in more cost effective approaches to maintenance/rehabilitation needs than has been experienced with plans developed by more conservative consultants. Staff feels that many consultant engineers, who provide very valuable expertise for complex geometric designs, are over designing projects where the intent is simply to improve the quality and condition of the pavement.

In addition, our district engineers have developed a safety improvement program utilizing recently released crash analysis software which helps them more quickly identify safety issues. This program allows them to focus the limited funding available to those areas where the greatest safety benefits can be realized. The increased focus on targeting safety improvements wisely is also reflected in the recently revised district engineers' performance plans.
It is felt that the lower recommended funding levels for maintenance will fall short of needs, but the pressure of this funding constraint will result in innovations and better management practices as our districts focus on pavement maintenance through a number of improved and learning approaches.

There is no doubt that at the recommended funding level the condition of some roads in the state will get decline. However, in some areas where our pavement condition goals are currently being exceeded, some roads can get worse while that area will still be able to meet their goals.

The staff recommendation anticipates aggressive innovation and, if this innovation is overestimated, the issue of pavement maintenance/rehabilitation funding will need to be revisited. But with the pressure of this constraint, it is more likely that innovation will occur, and occur rapidly. As future UTPs are developed each year the funding levels for all strategies of work will be revisited and adjusted based on the data available at that time.

The privatization of more maintenance activities currently performed by the department may be another way to realize additional funding for maintenance. Staff is recommending that we seriously explore privatized asset management approaches for the pavements in some of our larger metropolitan areas.

Mobility Funding Details
The staff recommendation for funding mobility projects to provide congestion relief is very simple. The recommendation is to start by using the 2004 UTP and Texas Mobility Fund allocation levels as a base, and allocate funding to the large metropolitan areas to bring the areas that are lagging behind in the implementation of projects "even " with the areas that have aggressively implemented projects.

Using this approach, the large metropolitan areas can develop the majority of their planned leverage projects. These projects include regional mobility managed toll projects and comprehensive development agreements.

Examples from a few districts are shown below:

Metro Area	Recommended Allocation Millions	Estimated Leveraged of Other Funds Millions	Total Value of Projects to be Constructed Millions
Dallas-Fort Worth	$ 1726	$ 3528	$ 5254
Austin	$ 523	$ 280	$ 803
San Antonio	$ 216	$ 748	$ 1000
Example Total	$ 2465	$ 4592	$ 7057

If we do not fund at the recommended levels, then not only will the regions loose out on the allocated funds, but their ability to leverage other funds will also be diminished. In the example shown above, by not providing $2.4 billion in UTP funding these three regions would potentially loose an opportunity to leveraging another $4.6 billion in toll revenues, jeopardizing more than $7 billion in construction. These mobility projects will also address the maintenance concerns on the roadways where they are located as many involve reconstruction of existing lanes as part of the project scope.

Similarly to the approach for providing funding to the metropolitan areas to bring them "even" to cover the majority of their leverage projects, the recommendation is to treat the smaller urban areas in a like manner.

Previous UTPs divided the mobility funding as 65 percent to the large metropolitan areas, 10 percent to the smaller urban areas and 25 percent for rural connectivity.

This recommendation, adjusting for projects planned to proceed to construction starting in May 2008 and beyond, allocates funding along those same proportions between large metropolitan and smaller urban areas.

Addressing the rural connectivity funding category in a like and proportionate manner would result in even more increased reductions to maintenance/rehabilitation funding.

Staff is recommending to address the large metropolitan funding at the "bring everyone even and meet as many of the leverage plans as possible" level, then address urban mobility funding in a proportionate and like manner, and finally place any remaining available mobility funding in the strategic priority and rural connectivity categories.

The rationale for this approach is that metropolitan and urban areas developed leverage and local funding plans based on the anticipation of state funding being made available. Many of these projects are being developed by regional mobility authorities and private sector partners as toll projects. In many cases, the votes at the MPOs to distribute these anticipated funds to these toll projects were subjected to extreme scrutiny and criticism. Staff feels that we should try to make good on these previous allocations upon which courageous MPO members voted to advance much needed projects in their regions. It is important that we remember that this recommendation does not provide funding at the levels these MPOs were originally expecting. Additionally and in general, congestion issues are most pressing in the metropolitan and urban areas as compared to the more rural areas.

The rural projects are the responsibility of the department to prioritize and implement. We are the "developers" on most of these projects. Because of the limited funding available to advance these projects we will simply have to re-engineer our rural projects to cost less, and delay the implementation of some of these projects. There will need to be a re-prioritization of these rural projects by the department.

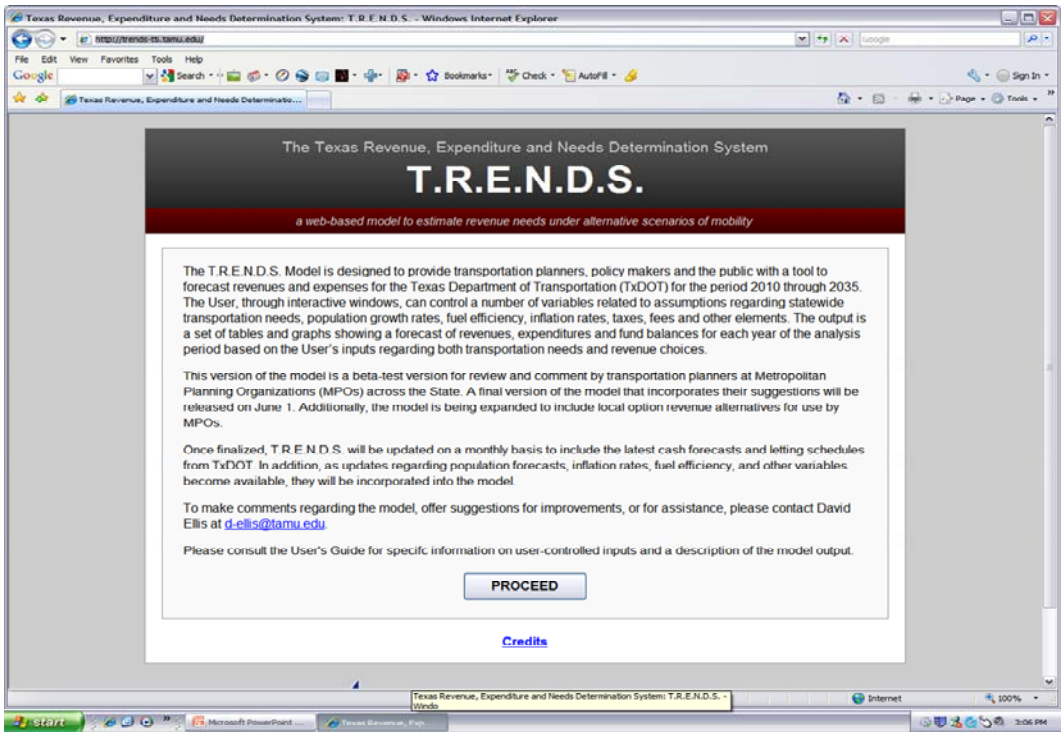
It is important to remember that the development and implementation of mobility projects has added benefits for pavement maintenance and preservation on other parts of our system. As mobility projects are implemented a great deal of the area's traffic is drawn to these new, less congested roadways, thereby reducing traffic on the other parts of our system. This migration of traffic usually includes large percentages of truck traffic. A single tractor trailer trucks cause nearly ten thousand more pavement damage than the average passenger vehicle. As this traffic shifts to these new pavements constructed using mobility funding, the demand for pavement maintenance and rehabilitation on other existing pavements is reduced. Additionally, many of the worst pavements in our state are those roadways in our metropolitan and urban areas that will be replaced and reconstructed as part of these larger mobility projects. It is difficult to calculate the impact of these two benefits alone on the pavement maintenance and rehabilitation needs of our state, but they are significant and must not be overlooked.

APPENDIX C

The TRENDS Financial Model

(Transportation Revenue Estimator and Needs Determination System)

The interface for generating custom revenue-enhancement scenarios:



What is TRENDS - *Transportation Revenue Estimator and Needs Determination System*)?

- TRENDS is a spreadsheet much like a business balance sheet, listing projected revenue and expenses.

- TRENDS program documents a strong mathematical relationship b/t population and state motor fuel taxes, and also population and vehicle registration. It also accounts for future impacts of improved fuel efficiency through a simple entry.

- It correlates past revenue trends with future funding scenarios.

- It allows for a quick examination of possible revenue changes using different population and fuel efficiency scenarios.

Where does TRENDS begin?

TRENDS provides a quick forecast of reasonable expectations based on current forecasts of revenue and expenditures.

The latest Revenue Forecasts from TxDOT's CFO are hard-coded into the TRENDS model.

Target funding levels for the 2009-2019 Unified Transportation Plan approved by the Texas Transportation Commission in April 2008 are also hard coded into TRENDS. These include Categories 1 - 12.

Categories 5-11 have minimum allocations established by state & federal law. The Category 1 (maintenance) & 12 (commission discretionary) are more discretionary and there was much debate on how much money to allocate in those areas.

At their meeting in April 2008, the Texas Transportation Commission decided how much funding to allocate to maintenance knowing what the condition of the pavement would be in the future. The Commission also knew there were prior commitments to be been funded so the difference was what was placed in mobility. They decided the funding allocations for Category 1 -12 and those were subsequently hard-coded into TRENDS.

TRENDS is a tool to help identify reasonable expectations based on any number of scenarios into the <u>future</u>.

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Assumptions Included in the $155 Billion Revenue Estimate

- No increase in the state fuel tax
- No increase in the federal fuel tax
- No increase in vehicle registration fees
- 97 percent of diesel is consumed by commercial vehicles
- 98 percent of gasoline is consumed by personal vehicles
- A mid-range fuel economy scenario (fleet-wide fuel efficiency for personal vehicles increases from 19.8 miles per gallon in 2008 to 49.2 miles per gallon in 2030; fleetwide

fuel efficiency for commercial vehicles increases from 6.1 miles per gallon to 7.8 miles per gallon in 2030)

Assumptions Included in Expense Calculations Beyond TxDOT Letting Estimates for 2009-2019

- TxDOT annual maintenance estimates were used for the period 2009 through 2019
- 5 percent annual increase in non-letting, maintenance, ferry, GIWW, right of way, vehicle registration, transit, travel/traffic, other agencies funded by TxDOT, and retirement expenses for the period 2020 through 2035
- No increase in Category 5, 6, 7, 8, 9, 10, and 11 funding for the period 2020-2030.

Reasons for Changing the Revenue Estimate from $158 Billion to $155 Billion

- The Fund Transfer – Special Revisions report was updated by TxDOT and changes were incorporated into the model.
- Gasoline, diesel fuel, and vehicle registration fee regression equations were updated to reflect changes in population which produced slightly different revenue projections in those items.
- Minor calculation errors were found in the original model and in the updated TRENDS model and were corrected.