

1. Report No. FHWA/TX-11/0-6395-TI-2	2. Government Accession No.	3. Recipient's Catalog No.	
4. Title and Subtitle DEVELOPMENT OF THE TEXAS REVENUE ESTIMATOR AND NEEDS DETERMINATION SYSTEM (T.R.E.N.D.S.) MODEL: FY 2010 ACTIVITIES		5. Report Date February 2011 Published: July 2011	
		6. Performing Organization Code	
7. Author(s) David Ellis, Brianne Glover, Nicolas Norboge, and Yuan Zhi		8. Performing Organization Report No. Report 0-6395-TI-2	
9. Performing Organization Name and Address Texas Transportation Institute The Texas A&M University System College Station, Texas 77843-3135		10. Work Unit No. (TRAIS)	
		11. Contract or Grant No. Project 0-6395-TI	
12. Sponsoring Agency Name and Address Texas Department of Transportation Research and Technology Implementation Office P.O. Box 5080 Austin, Texas 78763-5080		13. Type of Report and Period Covered Technical Report: September 2008–August 2010	
		14. Sponsoring Agency Code	
15. Supplementary Notes Project performed in cooperation with the Texas Department of Transportation and the Federal Highway Administration. Project Title: Modeling Revenue for Use in Developing Reasonable Expectations of Revenue for Long Range Plan Development URL: <a href="http://tti.tamu.edu/documents/0-6395-TI-2.pdf">http://tti.tamu.edu/documents/0-6395-TI-2.pdf</a>			
16. Abstract The T.R.E.N.D.S. model provides transportation planners, policy makers, and the public a tool to forecast revenues and expenses for the Texas Department of Transportation for the period 2010 through 2035 based on a user-defined level of transportation investment. The user, through interactive windows, can control a number of variables related to assumptions regarding statewide transportation needs, population growth rates, fuel efficiency, federal reimbursement rates, inflation rates, taxes, fees, and other elements. The output is a set of tables and graphs showing a forecast of revenues, expenditures, and fund balances for each year of the analysis period based on the user-defined assumptions. During FY 2010, a new module providing local option revenue projections was added. The analysis area for this module is the Metropolitan Planning Organization (MPO).			
17. Key Words T.R.E.N.D.S., Trends, Vehicle Miles Traveled, VMT, Gas Tax, Efficiency, Transportation Revenue, Revenue Projection		18. Distribution Statement No restrictions. This document is available to the public through NTIS: National Technical Information Service Alexandria, Virginia 22161 <a href="http://www.ntis.gov">http://www.ntis.gov</a>	
19. Security Classif.(of this report) Unclassified	20. Security Classif.(of this page) Unclassified	21. No. of Pages 24	22. Price



**DEVELOPMENT OF THE TEXAS REVENUE ESTIMATOR AND NEEDS  
DETERMINATION SYSTEM (T.R.E.N.D.S.) MODEL:  
FY 2010 ACTIVITIES**

by

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

Brianne Glover, J.D.  
Assistant Transportation Researcher  
Texas Transportation Institute

Nicolas Norboge  
Graduate Research Assistant  
Texas Transportation Institute

and

Yuan Zhi  
Graduate Research Assistant  
Texas Transportation Institute

Report 0-6395-TI-2

Project 0-6395-TI

Project Title: Modeling Revenue for Use in Developing Reasonable Expectations  
of Revenue for Long Range Plan Development

Performed in cooperation with the  
Texas Department of Transportation  
and the  
Federal Highway Administration

February 2011

Published: July 2011

TEXAS TRANSPORTATION INSTITUTE  
The Texas A&M University System  
College Station, Texas 77843-3135



## **DISCLAIMER**

This research was performed in cooperation with the Texas Department of Transportation (TxDOT) and the Federal Highway Administration (FHWA). The contents of this report reflect the views of the authors, who are responsible for the facts and the accuracy of the data presented herein. The contents do not necessarily reflect the official view or policies of the FHWA or TxDOT. This report does not constitute a standard, specification, or regulation.

## **ACKNOWLEDGMENTS**

The project team thanks the TxDOT and FHWA for support of this project. They particularly extend thanks to Jessica Castiglione, TxDOT project director, as well as the members of the project management committee, Stuart Hanzlik, Teresa Lemons and Jenny Peterman. The project team also wishes to thanks David Casteel for his encouragement and support.

# TABLE OF CONTENTS

	<b>Page</b>
List of Figures .....	viii
Research Report on the Development of the T.R.E.N.D.S. Model for Project 0-6395-TI.....	1
Overview.....	1
FY 2010 Activities: Addition of the Local Option Sub-Model and Expansion of the User's Guide .....	2
Calculations Used to Develop the Local Option Sub-Model .....	15
User's Guide .....	17

## LIST OF FIGURES

	<b>Page</b>
Figure 1. T.R.E.N.D.S. Model Initial Page.....	3
Figure 2. New Capacity.....	3
Figure 3. State Gasoline and Diesel Tax Variables.....	4
Figure 4. Federal Gasoline and Diesel Tax Variables.....	4
Figure 5. Fuel Tax Indexing.....	4
Figure 6. Vehicle Registration Fee.....	4
Figure 7. Vehicle Miles Traveled Tax.....	4
Figure 8. Fuel Efficiency.....	5
Figure 9. Fund 6 Allocations to Other Agencies.....	5
Figure 10. Maintenance Variables.....	5
Figure 11. Maintenance Variable Options.....	5
Figure 12. Expense Variables.....	5
Figure 13. Expense Variable Category Options.....	6
Figure 14. Other Expense Variable Options.....	6
Figure 15. Bond Finance Variables.....	7
Figure 16. Population Assumption.....	7
Figure 17. Report Menu.....	7
Figure 18. Local Revenue Options.....	8
Figure 19. MPO Area Selection.....	9
Figure 20. Detailed Local Fuel Tax Options.....	10
Figure 21. Detailed Local VMT Options.....	11
Figure 22. Detailed Local Vehicle Registration Fee Options.....	12
Figure 23. Local Fuel Efficiency Options.....	13
Figure 24. Expanded Format Options.....	14



# **RESEARCH REPORT ON THE DEVELOPMENT OF THE T.R.E.N.D.S. MODEL FOR PROJECT 0-6395-TI**

## **OVERVIEW**

This report recaps those activities associated with the continued development, expansion, and maintenance of the TRENDS model during FY 2010.

To review, the original purpose of Project 0-6395-TI was to assess the usefulness and viability of the Joint Analysis Using Combined Knowledge (J.A.C.K.) model as a planning and forecasting tool. The research was divided into three phases:

1. Assessing the accuracy and validity of the model and proposing fundamental improvements as necessary.
2. Investigating potential improvements to an expanded, more comprehensive J.A.C.K. model.
3. Producing a report on the research findings and submitting an improved model.

During the course of the research, the project direction changed significantly to focus entirely on model revision and development. As a result, what originally was named the J.A.C.K. model was substantially revised, expanded, and renamed the Texas Revenue Estimator and Needs Determination System (T.R.E.N.D.S.) model.

The T.R.E.N.D.S. model is designed to provide transportation planners, policy makers, and the public with a tool to forecast revenues and expenses for the Texas Department of Transportation (TxDOT) for the period 2010 through 2035 based on a user-defined level of transportation investment. The user, through interactive windows, can control a number of variables related to assumptions regarding statewide transportation needs, population growth rates, fuel efficiency, federal reimbursement rates, inflation rates, taxes, fees, and other elements. The output is a set of tables and graphs showing a forecast of revenues, expenditures, and fund balances for each year of the analysis period based on the user-defined assumptions.

The version of the model developed under this project was a beta-test version to solicit comments from metropolitan planning organizations (MPOs) across the state. A final version of the model that incorporates suggested changes was released in the summer 2009 under a modification to the original Project 0-6395-TI contract.

As the project moved into FY 2010, a new local option revenue model was to be added for use by each of the state's 25 MPOs. In addition, a substantially revised User's Guide was developed and made available. Finally, the model is maintained and updated on a monthly basis to include the latest cash forecasts and letting schedules from TxDOT. This effort is accomplished under a subsequent contract as updates regarding population forecasts, inflation rates, fuel efficiency, and

other variables become available. The web-based model is available at: <http://trends-tti.tamu.edu/>.

### **FY 2010 ACTIVITIES: ADDITION OF THE LOCAL OPTION SUB-MODEL AND EXPANSION OF THE USER'S GUIDE**

Figures 1 through 17 show the user interface for the model as it existed at the end of FY 2009. At that time, the user could control a number of variables including:

- Set the amount of new roadway capacity desired.
- Change the state gasoline and diesel tax rates.
- Change the federal gasoline and diesel tax rates.
- Index the fuel tax to either the Highway Cost Index, Consumer Price Index, or the rate of improvement in fuel efficiency.
- Change the vehicle registration fee.
- Impose a vehicle miles traveled (VMT) fee.
- Choose one of three fuel efficiency scenarios for the Texas vehicle fleet.
- Change the amount of annual “diversions” from Fund 6.
- Increase the use of bonds as a financing mechanism.
- Select from among four different population growth assumptions.

The Transportation Revenue Estimator and Needs Determination System

# T.R.E.N.D.S.

*a web-based model to estimate revenue needs under alternative scenarios of mobility*

The T.R.E.N.D.S. Model is designed to provide transportation planners, policy makers and the public with a tool to forecast revenues and expenses for the Texas Department of Transportation (TxDOT) for the period 2010 through 2035. The User, through interactive windows, can control a number of variables related to assumptions regarding statewide transportation needs, population growth rates, fuel efficiency, inflation rates, taxes, fees and other elements. The output is a set of tables and graphs showing a forecast of revenues, expenditures and fund balances for each year of the analysis period based on the User's inputs regarding both transportation needs and revenue choices.

T.R.E.N.D.S. will be updated on a monthly basis to include the latest cash forecasts and letting schedules from TxDOT. In addition, as updates regarding population forecasts, inflation rates, fuel efficiency, and other variables become available, they will be incorporated into the model.

To make comments regarding the model, offer suggestions for improvements, or for assistance, please contact David Ellis at [d-ellis@tamu.edu](mailto:d-ellis@tamu.edu).

Please consult the User's Guide for specific information on user-controlled inputs and a description of the model output.

PROCEED

[Credits](#)



**Figure 1. T.R.E.N.D.S. Model Initial Page.**

NEW CAPACITY

RESET

**New Capacity**

Would you like to invest additional state funds in increased transportation capacity? (Yes or No)

No

*The 2030 Committee has conducted a detailed study of Texas' transportation infrastructure needs. You can access their [conclusions regarding transportation needs here](#). You may enter a different level of investment if you choose.*

**Figure 2. New Capacity.**

**STATE GASOLINE AND DIESEL TAX VARIABLES** RESET

---

**State Gasoline Tax**

Would you like to increase the state gasoline tax? (Yes or No) No

---

**State Diesel Fuel Tax**

Would you like to increase the state diesel fuel tax? (Yes or No) No

**Figure 3. State Gasoline and Diesel Tax Variables.**

**FEDERAL GASOLINE AND DIESEL TAX VARIABLES** RESET

---

**Federal Gasoline Tax**

Would you like to increase the federal gasoline tax? (Yes or No) No

---

**Federal Diesel Fuel Tax**

Would you like to increase the federal diesel fuel tax? (Yes or No) No

---

Total federal reimbursement as a percent of federal fuel tax revenue: 85 %

**Figure 4. Federal Gasoline and Diesel Tax Variables.**

**INDEXING THE MOTOR FUELS TAX** RESET

---

**Motor Fuels Tax Indexing**

Do you want to index the state fuel tax to the rate of inflation of the state Highway Cost index? (Yes or No) No

---

Do you want to index the state fuel tax to the rate of inflation of the Consumer Price Index? (Yes or No) No

---

Do you want to index the state fuel tax to the rate of improvement in fuel efficiency? (Yes or No) No

---

If yes, in what fiscal year do you want the index to start? (Enter year) 2019 yyyy

**Figure 5. Fuel Tax Indexing.**

**VEHICLE REGISTRATION FEE VARIABLES** RESET

---

**Vehicle Registration Fee**

Would you like to increase the vehicle registration fees? (Yes or No) No

**Figure 6. Vehicle Registration Fee.**

**VMT TAX VARIABLES** RESET

---

**State VMT Tax**

Do you want to impose a state vehicle-miles-traveled (VMT) tax? (Yes or No) No

**Figure 7. Vehicle Miles Traveled Tax.**

## FUEL EFFICIENCY VARIABLES

**Fuel Efficiency**

Select the fuel efficiency assumption for personal vehicles.

Average  
 Low  
 High

Select the fuel efficiency assumption for commercial vehicles.

Average  
 Low  
 High

*Consult the User's Guide for a detailed explanation and specific values for each fuel efficiency assumption.*

**Figure 8. Fuel Efficiency.**

## FUND 6 ALLOCATIONS TO OTHER AGENCIES

RESET

**Fund 6 Allocations to Other Agencies**

Do you want to eliminate some or all the Fund 6 allocations to other agencies?

No

**Figure 9. Fund 6 Allocations to Other Agencies.**

## MAINTENANCE VARIABLES

**Maintenance**

*For a detailed explanation of the maintenance options, please see the User's Guide. For a more complete discussion, you can read the 2030 Committee report [here](#).*

Use current TxDOT maintenance scenario?

Yes

**Figure 10. Maintenance Variables.**

## MAINTENANCE VARIABLES

**Maintenance**

*For a detailed explanation of the maintenance options, please see the User's Guide. For a more complete discussion, you can read the 2030 Committee report [here](#).*

Use current TxDOT maintenance scenario?

No

For the 2030 Committee Maintenance estimate of pavements in good or better condition, use:

90 percent  
 87 percent  
 80 percent

**Figure 11. Maintenance Variable Options.**

## EXPENSE VARIABLES

RESET

**Expense Variables**

Use default values for category expense increases? (Currently 0%)

Yes

Use default values for other expense increases? (Currently 5%)

Yes

**Figure 12. Expense Variables.**

EXPENSE VARIABLES		RESET
<b>Expense Variables</b>		
Use default values for category expense increases? (Currently 0%)	No	
Annual percent increase in Category 5 CMAQ expenses (2020-2035)	0 %	
Annual percent increase in Category 7 STP Metro Mobility and Maintenance expenses (2020-2035)	0 %	
Annual percent increase in Category 8 Federal Safety expenses (2020-2035)	0 %	
Annual percent increase in Category 9 Federal Enhancement expenses (2020-2035)	0 %	
Annual percent in Category 10 Congressional Earmarks TPWD expenses	0 %	
Annual percent increase in Category 11 District Discretionary funding (2020-2035)	0 %	
Use default values for other expense increases? (Currently 5%)	Yes	

**Figure 13. Expense Variable Category Options.**

EXPENSE VARIABLES		RESET
<b>Expense Variables</b>		
Use default values for category expense increases? (Currently 0%)	Yes	
Use default values for other expense increases? (Currently 5%)	No	
Annual percent increase in engineering, administration, and research expenses (2020-2035)	5 %	
Annual percent increase in Right of Way expenses (2020-2035)	5 %	
Annual percent increase in Pavement Maintenance and Construction expenses (2020-2035)	5 %	
Annual percent increase in Ferry Operations expenses(2020-2035)	5 %	
Annual percent increase in GIWW Operations expenses (2020-2035)	5 %	
Annual percent increase in Travel/Traffic expenses (2020-2035)	5 %	
Annual percent increase in vehicle registration expenses (2020-2035)	5 %	
Annual percent increase in ABTPA expenses (2020-2035)	5 %	
Annual percent increase in cost of other agencies funded by TxDOT (2020-2035)	5 %	
Annual percent increase in contributions from TxDOT to Comptroller and Retirement (2020-2035)	5 %	

**Figure 14. Other Expense Variable Options.**

**BOND FINANCE VARIABLES**

RESET

**Bond Finance Variables**

Do you want to issue Proposition 12 bonds? (Yes or No)

No

Do you want to Issue Proposition 14 Bonds? (Yes or No)

No

**Figure 15. Bond Finance Variables.**

**POPULATION OPTION**

**Population Growth Assumptions**

I would like to use a population projection that assumes (choose one):

Migration rates will be **one-half those experienced from 1990 to 2000**. (This is the "low" population growth forecast and produces a projected Texas population of **31.8 million people in 2030**.)

Migration rates will be **equal to those experienced from 2000 to 2004**. (This is the "medium" population growth forecast and produces a projected Texas population of **36.3 million people in 2030**.)

Migration rates will be **equal to those experienced from 2000 to 2007**. (This population growth forecast produces a projected Texas population of **37.3 million people in 2030**, slightly more than the "medium" growth forecast.)

Migration rates will be **equal to those experienced from 1990 to 2000**. (This is the "high" population growth forecast and produces a projected Texas population of **41.1 million people in 2030**.)

**Figure 16. Population Assumption.**

**OUTPUT OPTIONS**

**Report Formatting**

In my report, show me (check all that apply):

Check here to select ALL

The variables I've chosen for this analysis

A summary of revenues and expenses by year

A graph of revenues minus expenses by year

A graph of cumulative revenues minus expenses

A revenue and expense statement for the period 2010 through 2030

A revenue and expense statement for each year from 2010 through 2030

A revenue and expense statement for the period 2010 through 2035

**Figure 17. Report Menu.**

Figures 18 through 24 illustrate the portion of the model added in FY 2010 related to local revenue options. In this section of the model, the first question asked is whether the user wishes to perform a local option revenue analysis. The default answer is “No.” (See Figure 18.)

LOCAL OPTIONS	
<b>Local Revenue Options</b> Do you want to do a local option revenue analysis? Yes/No	No
<b>Local Fuel Tax</b> Do you want to change local fuel tax rate? Yes/No	No
<b>Local VMT</b> Do you want to change local VMT? Yes/No	No
<b>Local Vehicle Registration Fee</b> Do you want to change local Vehicle Registration Fee? Yes/No	No
<b>Local Fuel Efficiency</b> Do you want to change local fuel efficiency? Yes/No	No

**Figure 18. Local Revenue Options.**



If the answer in the dropdown menu is changed to “Yes,” a list of all 25 of the state’s MPOs appear. The user can then select a particular MPO (or multiple MPOs) in which to levy a local option fee or tax by clicking on the box adjacent to the MPO name. (See [Figure 19.](#))

**LOCAL OPTIONS**

**Local Revenue Options**

Do you want to do a local option revenue analysis? Yes/No Yes

Select the Metropolitan Planning Organization to be included in the analysis: Check here to select ALL

Ablene <input type="checkbox"/>	Hidalgo <input type="checkbox"/>	San Angelo <input type="checkbox"/>
Amarillo <input type="checkbox"/>	Houston/Galveston <input type="checkbox"/>	San Antonio <input type="checkbox"/>
Beaumont <input type="checkbox"/>	Killeen/Temple <input type="checkbox"/>	Sherman/Denison <input type="checkbox"/>
Brownsville/Harlingen <input type="checkbox"/>	Laredo <input type="checkbox"/>	Texarkana <input type="checkbox"/>
Bryan/College Station <input type="checkbox"/>	Longview <input type="checkbox"/>	Tyler <input type="checkbox"/>
Capital Area <input type="checkbox"/>	Lubbock <input type="checkbox"/>	Victoria <input type="checkbox"/>
Corpus Christi <input type="checkbox"/>	Midland/Odessa <input type="checkbox"/>	Waco <input type="checkbox"/>
El Paso <input type="checkbox"/>	NCTCOG <input type="checkbox"/>	Wichita Falls <input type="checkbox"/>

**Local Fuel Tax**

Do you want to change local fuel tax rate? Yes/No No

**Local VMT**

Do you want to change local VMT? Yes/No No

**Local Vehicle Registration Fee**

Do you want to change local Vehicle Registration Fee? Yes/No No

**Local Fuel Efficiency**

Do you want to change local fuel efficiency? Yes/No No

**Figure 19. MPO Area Selection.**

Below the list of MPOs, the user is then asked “Do you want to change the local gasoline tax rate?” The default answer is “No.” If the answer is changed to “Yes” in the drop-down menu to the right, the user is then asked the rate of the tax in cents per gallon and the fiscal year in which the user wants the increase to become effective. Next, the user is asked if he/she would like to increase the diesel fuel tax. Again, the default answer is “No.” If the answer is changed to “Yes” in the drop-down menu to the right, the user is then asked the rate of the tax in cents per gallon and the fiscal year in which the user wants the increase to become effective. (See [Figure 20](#) below.)

LOCAL OPTIONS	
<b>Local Revenue Options</b>	
Do you want to do a local option revenue analysis? Yes/No	No
<b>Local Fuel Tax</b>	
Do you want to change local fuel tax rate? Yes/No	Yes
How much would you increase the local gasoline tax? (Enter increase in cents per gallon.)	0 cents
In which year would you like the increase to become effective? (Enter the year.)	2012 yyyy
How much would you increase the local diesel tax? (Enter increase in cents per gallon.)	0 cents
In which year would you like the increase to become effective? (Enter the year.)	2012 yyyy
<b>Local VMT</b>	
Do you want to change local VMT? Yes/No	No
<b>Local Vehicle Registration Fee</b>	
Do you want to change local Vehicle Registration Fee? Yes/No	No
<b>Local Fuel Efficiency</b>	
Do you want to change local fuel efficiency? Yes/No	No

**Figure 20. Detailed Local Fuel Tax Options.**

Figure 21 allows the user to impose a vehicle miles traveled tax. Similar to the local fuel tax option, the user is asked “Do you want to change the local VMT tax rate?” The default answer is “No.” If the answer is changed to “Yes” in the drop-down menu to the right two additional questions year. First, the user is asked the rate of the tax in cents per gallon that is imposed on personal vehicles. Next, the user is asked the rate of the tax in cents per gallon that is imposed on commercial vehicles. Finally, the user is asked to enter the fiscal year in which the tax(es) is(are) to become effective. (See Figure 21 below.)

LOCAL OPTIONS	
<b>Local Revenue Options</b>	
Do you want to do a local option revenue analysis? Yes/No	No
<b>Local Fuel Tax</b>	
Do you want to change local fuel tax rate? Yes/No	No
<b>Local VMT</b>	
Do you want to change local VMT? Yes/No	Yes
How much would you want to change the local personal VMT?	0 cents
How much would you want to change the local commercial VMT?	0 cents
In which year would you like the increase to become effective? (Enter the year.)	2012 yyyy
<b>Local Vehicle Registration Fee</b>	
Do you want to change local Vehicle Registration Fee? Yes/No	No
<b>Local Fuel Efficiency</b>	
Do you want to change local fuel efficiency? Yes/No	No

**Figure 21. Detailed Local VMT Options.**

Figure 22 allows the user to increase the local vehicle registration fee. Similar to the VMT tax option, the user is asked “Do you want to change the local vehicle registration fee rate?” Again, the default answer is “No.” If the answer is changed to “Yes” in the drop-down menu to the right four additional questions appear. These four questions allow the user to set the annual vehicle registration fee for several different classifications of vehicles: a personal vehicle with a gross vehicle weight less than 6,000 lb, a personal vehicle with a gross vehicle weight greater than 6,000 lb, a truck less than 1-ton, and a truck with greater than a 1-ton carrying capacity, and set the local vehicle registration fee for a motorcycle. Finally, the user is asked in which fiscal year the increase is to take place. (See Figure 22 below.)

LOCAL OPTIONS	
<b>Local Revenue Options</b>	
Do you want to do a local option revenue analysis? Yes/No	No
<b>Local Fuel Tax</b>	
Do you want to change local fuel tax rate? Yes/No	No
<b>Local VMT</b>	
Do you want to change local VMT? Yes/No	No
<b>Local Vehicle Registration Fee</b>	
Do you want to change local Vehicle Registration Fee? Yes/No	Yes
How much would you want to change the local passenger vehicle fee? (<6000LBS)	0 \$
How much would you want to change the local passenger vehicle fee? (>6000LBS)	0 \$
How much would you want to change the local truck fee? (<1Ton)	0 \$
How much would you want to change the local truck fee? (>1Ton)	0 \$
How much would you want to change the local motorcycle fee?	0 \$
In which year would you like the increase to become effective? (Enter the year.)	2012 yyyy
<b>Local Fuel Efficiency</b>	
Do you want to change local fuel efficiency? Yes/No	No

**Figure 22. Detailed Local Vehicle Registration Fee Options.**

The final user-controlled variable in the local option sub-model relates to the local fuel efficiency in which the user is asked if they wish to change the fuel efficiency for the local area as opposed to the state as a whole. Again, the default answer is “No.” However, if the user feels the mix of vehicles in the local fleet is different than that assumed for the state as a whole, a different fuel efficiency selection can be made by selecting “Yes” in the drop-down menu and a new set of variables appears. The user then can change the fuel efficiency scenario for commercial vehicles, personal vehicles, or both types of vehicles. (See [Figure 23](#) below.)

LOCAL OPTIONS	
<b>Local Revenue Options</b>	
Do you want to do a local option revenue analysis? Yes/No	No
<b>Local Fuel Tax</b>	
Do you want to change local fuel tax rate? Yes/No	No
<b>Local VMT</b>	
Do you want to change local VMT? Yes/No	No
<b>Local Vehicle Registration Fee</b>	
Do you want to change local Vehicle Registration Fee? Yes/No	No
<b>Local Fuel Efficiency</b>	
Do you want to change local fuel efficiency? Yes/No	Yes
Select the fuel efficiency assumption for local commercial vehicles.	<input checked="" type="radio"/> Average <input type="radio"/> Low <input type="radio"/> High
Select the fuel efficiency assumption for local personal vehicles.	<input checked="" type="radio"/> Average <input type="radio"/> Low <input type="radio"/> High

**Figure 23. Local Fuel Efficiency Options.**

Once all desired variable values are entered, the user can then select the reports that are desired. There are nine different reports that can be selected. Among them:

- Chosen variables.
- Revenue and expense summary by year.
- Annual revenue and expense graph.
- Cumulative revenue and expense graph.
- Detailed annual revenue and expense statement.
- Revenue statement for local option taxes and fees.

The graphs and tables are also available in PDF format and can be saved to disk or other media for printing.

**OUTPUT OPTIONS**

**Report Formatting**  
In my report, show me (check all that apply):

Check here to select ALL

The variables I've chosen for this analysis	<input type="checkbox"/>
A summary of revenues and expenses by year	<input type="checkbox"/>
A graph of revenues minus expenses by year	<input type="checkbox"/>
A graph of cumulative revenues minus expenses	<input type="checkbox"/>
A revenue and expense statement for the period 2010 through 2030	<input type="checkbox"/>
A revenue and expense statement for each year from 2010 through 2030	<input type="checkbox"/>
A revenue and expense statement for the period 2010 through 2035	<input type="checkbox"/>
A statement of revenue for the local options selected for the period 2010 through 2030	<input type="checkbox"/>
A statement of revenue for the local options selected for the period 2010 through 2035	<input type="checkbox"/>

**Figure 24. Expanded Format Options.**

## **CALCULATIONS USED TO DEVELOP THE LOCAL OPTION SUB-MODEL**

The following steps were used to develop the Local Option Sub-Model:

1. The Roadway-Highway Inventory (RHiNo) file provides data of commercial and total vehicle miles traveled by county by year. The years 2000 through 2007 were used.
2. For each year of RHiNo file data, the commercial truck VMT was subtracted from total VMT to derive personal vehicle VMT.
3. The respective percentages of personal and commercial VMT were calculated for each county for each year.
4. Total VMT by county as shown in RHiNo file data was divided by total statewide as shown in the RHiNo file data to calculate a share of total statewide VMT by county.
5. The statewide VMT totals calculated by the T.R.E.N.D.S. model for years 2000 through 2007 were used as control totals and then multiplied by the county VMT share calculated in Step 4 to arrive at an adjusted total VMT by county.
6. The percentage of personal and commercial VMT by county was calculated from the data produced in Step 3.
7. The percentage of personal and commercial VMT by county calculated in Step 6 was multiplied by the adjusted total VMT for each county as calculated in Step 5 to produce adjusted personal and commercial VMT for each county for the years 2000 through 2007.
8. Population estimates by county obtained from the State Data Center for the years 2000 through 2007.
9. Per capita personal and commercial VMT was derived by dividing the adjusted personal and commercial VMT calculated in Step 7 by the estimated population.
10. The average annual rate of change in per capita personal and commercial VMT was calculated for the period 2000–2007.
11. Population projections for the period 2008 through 2035 for each county were obtained from the State Data Center.
12. The average annual rate of change in personal and commercial per capita VMT was then used to calculate per capita personal and commercial VMT for each year through 2035.
13. The projections of personal and commercial per capita VMT by county calculated in Step 12 were then multiplied by county population projections from the State Date Center.

14. The projections of personal and commercial VMT by county derived in Step 13 were then adjusted using the total statewide commercial and personal VMT calculated in the T.R.E.N.D.S. model as a control total.
15. The projected commercial and personal VMT calculated in Step 14 become the basis for calculating projected VMT fees.
16. The projected commercial and personal VMT calculated in Step 14 when divided by the personal and commercial vehicle fuel efficiencies used in the T.R.E.N.D.S. provide the number of gallons of gasoline (personal) and diesel fuel (commercial) consumed.
17. The number of gallons of gasoline and diesel fuel consumed multiplied by the tax rate provides the projected fuel tax revenue.
18. The number of registered vehicles by vehicle class (motorcycles, passenger cars < 6,000 lb, passenger cars > 6,000 lb, trucks < 6,000 lb, trucks > 6,000 lb) for the period 2000 through 2008 was obtained from the Department of Motor Vehicles.
19. The average number of vehicles per capita by county by vehicle class was calculated by multiplying the data described in Step 18 by the estimated population for the same period.
20. The projected number of vehicles by vehicle class by county was derived by multiplying the per capita data derived in Step 19 by the projected population described in Step 11.
21. The projected number of vehicles by class by county became the basis of calculating vehicle registration fees.
22. The procedures described above were repeated for each of the four population growth scenarios produced by the State Data Center.
23. Counties were aggregated by MPO to produce local option revenue estimates.



## **USER'S GUIDE**

The User's Guide can be accessed at all times by clicking on the button labeled "Read User's Guide" at the top of any screen. The guide is available in PDF format and can be saved to disk and printed as desired.

The User's Guide serves three main purposes. First, it acts as a supplemental guide to help the T.R.E.N.D.S. model user accurately understand all input variables so that outputs generated accurately reflect what the user intends them to be. Second, the User's Guide helps to explain how to interpret all of the model outputs generated. Third, the User's Guide serves as a reference for where population, fuel efficiency, and revenue forecast data were obtained.

The T.R.E.N.D.S. model User's Guide was created to help users understand the variables and their related assumptions regarding statewide transportation needs, population growth rates, fuel efficiency, inflation rates, taxes, fees, and other elements. The User's Guide also helps to describe the output variables, such as the set of tables and graphs showing forecast of revenues, expenditures, and fund balances for each year of the analysis period. The User's Guide explains how to access the model. Through offering a step-by-step guide for accessing the model, the user can then log on and use the model.

The guide is divided into two major sections: input variables and output variables. The input section of the User's Guide is intended to offer a clear, step-by-step guide for each of the input variables as well as a more detailed explanation of each input variable. The output section provides the T.R.E.N.D.S. user with a detailed explanation on the output of each model and instructions for how to obtain the final report in PDF format.

Under the New Capacity variable section, the User's Guide walks the user through the implications of adding new capacity to highway infrastructure. Depending on the response, the User's Guide also helps to explain the additional variables involved in the analysis. The User's Guide also walks the user through the format of the input that should be entered for each input.

For the Federal Gasoline and Diesel Tax Variables section, the User's Guide also helps the user differentiate between federal and state gas tax entries. While several variables are straightforward, the background of some of the more complex variables is provided. For example, under the "Index Motor Fuels Tax" section, the model asks the user if he/she wishes to index the state motor fuel tax rate to the highway cost index (HCI) or the consumer price index (CPI). The User's Guide helps the T.R.E.N.D.S. model explain the difference between both models and helps the user select which index is most appropriate for his/her purposes.

For fuel efficiency input variables, the User's Guide also acts as a necessary supplement to help the user select the most appropriate variable for their analysis. The User's Guide explains where future population projection and fuel economy data were obtained. Criteria used to differentiate between personal and commercial vehicles is also provided in the model.

The User's Guide also explains the ability for the user to eliminate Fund 6 diversions to other agencies. The User's Guide provides background on current Fund 6 allocations, and the

implications from removing the diversions. Also provided is a lengthy discussion on the different maintenance options as outlined in the 2030 Committee Report and helps the user understand the implications of each maintenance scenario allocation.

For the expense variables section of the model, a detailed explanation of each fund expense category is provided. In the bond finance variables section, the User's Guide helps the user differentiate between Proposition 12 and Proposition 14 bond financing tools. Also explained are the assumptions implicit in each population scenario and how and by whom the forecasts used in the model were made. Finally, the User's Guide walks the user through the available local option inputs and allows the user to select a specific MPO.

In addition to explaining user inputs, the User's Guide provides an explanation of each output generated by the T.R.E.N.D.S. model. Depending on which outputs the user selects, the User's Guide will help the user walk through all outputs. For the revenue and expense statements, the User's Guide helps to explain each expenditure category more thoroughly. All graphical outputs are also addressed.

Finally, Appendix A in the User's Guide provides a more detailed explanation on the population projection process and information concerning the different population scenarios the user can select. Appendix B provides more detailed information related to distinctions between personal and commercial vehicles in accordance with Texas Transportation Code Section 501.241.