T.R.E.N.D.S. Model
Background Briefing

House Select Committee on Transportation Funding
Subcommittee on Funding

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Key T.R.E.N.D.S. Model Variables

• Population
• Fuel Efficiency
  ➢ Personal Vehicles
  ➢ Commercial Vehicles
• Fuel Consumption/Population Relationship
  ➢ Gasoline
  ➢ Diesel
• Vehicle Registration Fee Revenue/Population Relationship
Alternative Fuel Efficiency Assumptions for Commercial Vehicles

- Low
- Medium
- High

Miles Per Gallon

2006 to 2040
Regression Line for Taxable Gallons of Gasoline Sold

\[ y = 0.4611x + 0.6921 \]

\[ R^2 = 0.9242 \]
Regression Line for Taxable Gallons of Diesel Sold

\[ y = 0.3262x - 4.101 \]

\[ R^2 = 0.9629 \]
Regression Line for Vehicle Registration Fee Revenues

\[ y = 0.0652x - 0.6083 \]

\[ R^2 = 0.9705 \]
Other Variables

- Consumer Price Index
- Highway Cost Index
- Annual inflation rates of TxDOT “internal” costs
- Alternative pavement condition scores
- “Diversions”
- Bonds
- State and federal fuel tax rates
- Vehicle registration fee rates
- VMT fee
- Indexed fuel taxes
- Transportation/Public Education allocation
How the Model Works

• Use Gallons Consumed/Population Relationship Equation (Use Future Population to Project Future Gasoline Consumption)

• Projected Gallons Consumed divided by Historical Fuel Efficiency equals Projected VMT

• Allocate Gasoline Generated VMT to Personal and Commercial Use

• Projected VMT for Personal Driving divided by New Fuel Efficiency for Personal Vehicles equals Fuel-Efficiency Adjusted Gallons of Gasoline Consumed

• Fuel-Efficiency Adjusted Gallons Consumed multiplied by the fuel tax rate equals gasoline tax revenue

• Do the same thing for Commercial VMT to get Commercial gallons of gasoline and gasoline tax revenue.
Then....

• Follow the same procedure for
  – three other population scenarios
  – two other fuel efficiency scenarios
  – federal gasoline taxes and
  – state and federal diesel fuel consumption and tax revenues.
Then....

- Calculate vehicle registration fee revenues from regression equation
- Use derived VMT to calculate VMT tax
Expenses

- First 10 years of expenses are taken for the Cash Forecast development TxDOT Finance Division.
- From year 11 forward, annual costs are escalated at a rate chosen by user input.
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.

This version of the model is a beta-test version for review and comment by transportation planners at Metropolitan Planning Organizations (MPOs) across the State. A final version of the model that incorporates their suggestions will be released on June 1. Additionally, the model is being expanded to include local option revenue alternatives for use by MPOs.

Once finalized, 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.

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

PROCEED

Credits

T.R.E.N.D.S. was developed jointly by the Texas Department of Transportation and the Texas Transportation Institute

Project Director
NEW CAPACITY

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.

STATE GASOLINE AND DIESEL TAX VARIABLES

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

FEDERAL GASOLINE AND DIESEL TAX VARIABLES

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 %
**NEW CAPACITY**

*New Capacity*

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

Yes

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.

How much total additional capacity funding would you like to provide? (in billions of dollars)

$0

Enter the year when you would like the capacity additions to begin.

2013

Enter the year you would like the additional capacity to be completed.

2035

**STATE GASOLINE AND DIESEL TAX VARIABLES**

*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

**FEDERAL GASOLINE AND DIESEL TAX VARIABLES**

*Federal Gasoline Tax*

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

No

Federal Diesel Fuel Tax

STATE GASOLINE AND DIESEL TAX VARIABLES

**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

FEDERAL GASOLINE AND DIESEL TAX VARIABLES

**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 %

INDEXING THE MOTOR FUELS TAX

**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

If yes, in what fiscal year do you want the index to start? (Enter year)  
2019 yyyy
### State Gasoline and Diesel Tax Variables

**State Gasoline Tax**
- Would you like to increase the state gasoline tax? (Yes or No): Yes
- How much would you increase the state gasoline tax? (Enter increase in cents per gallon): 0 cents
- In what fiscal year would you like the increase to become effective? (Enter fiscal year): 2019
- Would you like to increase the state gasoline tax again? (Yes or No): Yes
- How much would you increase the state gasoline tax? (Enter the 2nd increase in cents per gallon): 0 cents
- When would you like the second increase to become effective? (Enter fiscal year): 2019

**State Diesel Fuel Tax**
- Would you like to increase the state diesel fuel tax? (Yes or No): No

### Federal Gasoline and Diesel Tax Variables

**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%
### STATE GASOLINE AND DIESEL TAX VARIABLES

**State Gasoline Tax**
- Would you like to increase the state gasoline tax? (Yes or No) Yes
- How much would you increase the state gasoline tax? (Enter increase in cents per gallon) 0 cents
- In what fiscal year would you like the increase to become effective? (Enter fiscal year) 2019
- Would you like to increase the state gasoline tax again? (Yes or No) No

**State Diesel Fuel Tax**
- Would you like to increase the state diesel fuel tax? (Yes or No) Yes
- How much would you increase the state diesel fuel tax? (Enter increase in cents per gallon) 0 cents
- In what fiscal year would you like the increase to become effective? (Enter fiscal year) 2019
- Would you like to increase the state diesel fuel tax again? (Yes or No) No

### FEDERAL GASOLINE AND DIESEL TAX VARIABLES

**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%
INDEXING THE MOTOR FUELS TAX

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

PERCENT OF REVENUE DEDICATED TO TRANSPORTATION

Percent of Revenue Dedicated to Transportation

Enter the net percent of the state fuel tax increase dedicated to transportation. 74 %

Note: Under current constitutional provisions, 75 percent of the state motor fuel tax is dedicated to transportation. However, the effective net percentage dedicated to transportation is approximately 74 percent. For example, if you fail to maintain the current constitutional provisions, enter 74 percent. If you would like all the fuel tax revenues derived from the increase you entered earlier to be dedicated to transportation, enter 100 percent.

VEHICLE REGISTRATION FEE VARIABLES

Vehicle Registration Fee

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

VMT TAX VARIABLES

State VMT Tax

Do you want to impose a state vehicle-miles-traveled (VMT) tax? (Yes or No) No
# T.R.E.N.D.S. Model
**Transportation Revenue Estimator and Needs Determination System**

## Vehicle Registration Fee Variables

**Vehicle Registration Fee**
Would you like to increase the vehicle registration fees? (Yes or No)
- Yes
- No

## VMT Tax Variables

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

## 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.*

## Fund 6 Allocations to Other Agencies

**Fund 6 Allocations to Other Agencies**
Do you want to eliminate some or all the Fund 6 allocations to other agencies?
- Yes
- No
VMT TAX VARIABLES

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

- **Yes**

Enter VMT fee per mile for personal vehicles (cents per mile)

- 0 cents

Enter the fiscal year to begin collecting VMT fee on personal vehicles.

- 2019

Enter VMT fee per mile for commercial vehicles (cents per mile)

- 0 cents

Enter the fiscal year to begin collecting the VMT fee on commercial vehicles.

- 2019

If you would like to end the state gasoline tax, enter the last fiscal year to collect the tax.

- 2019

If you would like to end the state diesel fuel tax, enter the last fiscal year to collect the tax.

- 2019

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.
**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.)

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**LOCAL OPTIONS**

**Local Revenue Options**
Do you want to do a local option revenue analysis? Yes/No
No

**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
## T.R.E.N.D.S. Model
Transportation Revenue Estimator and Needs Determination System

### OUTPUT OPTION

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

<table>
<thead>
<tr>
<th>Option</th>
<th>Box</th>
</tr>
</thead>
<tbody>
<tr>
<td>The variables I've chosen for this analysis</td>
<td></td>
</tr>
<tr>
<td>A summary of revenues and expenses by year</td>
<td></td>
</tr>
<tr>
<td>A graph of revenues minus expenses by year</td>
<td></td>
</tr>
<tr>
<td>A graph of cumulative revenues minus expenses</td>
<td></td>
</tr>
<tr>
<td>A revenue and expense statement for the period 2009 through 2030</td>
<td></td>
</tr>
<tr>
<td>A revenue and expense statement for the period 2009 through 2035</td>
<td></td>
</tr>
<tr>
<td>A statement of revenue for the local options selected for the period 2010 through 2030</td>
<td></td>
</tr>
<tr>
<td>A statement of revenue for the local options selected for the period 2010 through 2035</td>
<td></td>
</tr>
</tbody>
</table>

[Submit]
[Reset All Values]
Cumulative Balance of Funds
(Assuming Midline Population Growth Estimate)
<table>
<thead>
<tr>
<th>Fiscal Year</th>
<th>Total Revenues</th>
<th>Maintenance and Operating Expenditures</th>
<th>New Capacity Expenditures</th>
<th>Annual Balance of Funds</th>
<th>Cumulative Balance</th>
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</thead>
<tbody>
<tr>
<td>2010</td>
<td>$8,758,866,295</td>
<td>$5,719,566,241</td>
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<td>$3,039,300,054</td>
<td>$3,039,300,054</td>
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<td>$2,466,441,685</td>
<td>$5,505,741,739</td>
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<td>2012</td>
<td>$7,331,042,188</td>
<td>$6,565,611,249</td>
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<td>$765,430,938</td>
<td>$6,271,172,677</td>
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<tr>
<td>2013</td>
<td>$7,394,794,904</td>
<td>$6,662,663,504</td>
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<td>$732,131,400</td>
<td>$7,003,304,077</td>
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<tr>
<td>2014</td>
<td>$7,455,331,884</td>
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<td>$667,149,961</td>
<td>$7,670,454,038</td>
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<td>2015</td>
<td>$6,582,076,715</td>
<td>$7,063,421,961</td>
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<td>$2,466,441,685</td>
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<td>2016</td>
<td>$6,600,459,874</td>
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<td>$765,430,938</td>
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<td>2017</td>
<td>$6,611,094,702</td>
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<td>2018</td>
<td>$6,612,209,268</td>
<td>$8,711,630,578</td>
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<td>$2,466,441,685</td>
<td>$5,505,741,739</td>
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<td>2019</td>
<td>$6,603,964,888</td>
<td>$8,999,905,699</td>
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<td>$765,430,938</td>
<td>$6,271,172,677</td>
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<td>2033</td>
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<td>2034</td>
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<td>2035</td>
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<td>TOTAL:</td>
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<td>$327,086,705,804</td>
<td></td>
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<td>-$125,295,337,033</td>
</tr>
</tbody>
</table>
The On-Line Version

http://trends-tti.tamu.edu/
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