

Technical Advisory – Fuel Efficiency by Scenario and Other Import Spreadsheet Updates

Note: This update affects the Import Spreadsheet format by adding new inputs to the Modes and Travel screens. Please be aware of these changes before importing a project. We recommend that you try importing a single project first to make sure you are using the latest format.

Fuel Efficiency as a New Travel Input

TREDIS has a new input, **Fuel Per Mile**, which may be adjusted in the Travel screen with data fields that are similar to other travel characteristics (like VMT or passenger trips). Fuel per mile parameters can now be adjusted by mode, trip purpose, year, and scenario.

The Travel screen tabs have been updated, separating **Fuel** as a separate tab. Included in this tab are all fuel related inputs: Fuel Cost w/Taxes, Federal Fuel Tax, State Fuel Tax, and the new input Fuel Per Mile. The former **Taxes, Fees, Tolls** tab is now called **Charges, Fees, Tolls**.

| Alternative | Region | Period | Mode | Purpose | Fuel Type | Fuel Cost w/Taxes | Federal Fuel Tax | State Fuel Tax | Fuel Per Mile |
|-------------|-----------------------|---------|-------------------------|----------|-----------|-------------------|------------------|----------------|---------------|
| Base | Two Random Counties | Weekend | Light/Medium Duty Truck | Freight | Diesel | 3.00 | 0.25 | 0.25 | 0.137 |
| Base | Two Random Counties | Weekend | Commuter Rail | Business | Diesel | 3.00 | 0.25 | 0.25 | 2.752 |
| Base | Two Random Counties | Weekend | Commercial Jet | Business | Av-Fuel | 4.50 | 0.20 | 0.00 | 1.653 |
| Base | Two Random Counties | Weekend | Passenger Ferry | Personal | Marine | 3.25 | 0.00 | 0.00 | 10.352 |
| Base | Two Random Counties | Weekday | Passenger Car | All | Gasoline | 2.00 | 0.20 | 0.25 | 0.046 |
| Base | Two Random Counties | Weekday | Light/Medium Duty Truck | Freight | Diesel | 3.00 | 0.25 | 0.25 | 0.137 |
| Base | Two Random Counties | Weekday | Commuter Rail | Business | Diesel | 3.00 | 0.25 | 0.25 | 2.752 |
| Base | Two Random Counties | Weekday | Commercial Jet | Business | Av-Fuel | 4.50 | 0.20 | 0.00 | 1.653 |
| Base | Two Random Counties | Weekday | Passenger Ferry | Personal | Marine | 3.25 | 0.00 | 0.00 | 10.352 |
| Project | Three Random Counties | Weekend | Passenger Car | All | Gasoline | 2.00 | 0.20 | 0.25 | 0.046 |
| Project | Three Random Counties | Weekend | Light/Medium Duty Truck | Freight | Diesel | 3.00 | 0.25 | 0.25 | 0.137 |

The addition of the Fuel Per Mile input allows the user to specify changes or differences in fuel efficiency for various years and project alternatives.

For example, if average fuel efficiency for Passenger Cars is assumed to improve for the fleet between 2020 and 2030, Fuel Per Mile might be entered as 0.0465 (approximately 21.5 mpg) in the grid for 2020 in the Travel screen, and the same characteristic can be entered as 0.0455 (approximately 22.0 mpg) for the year 2030, reflecting an improvement in average fleet fuel efficiency.

Users can also input different fuel efficiencies between alternatives in the same year to see fuel use savings and, by extension, fuel cost savings if fuel efficiency improves.

Note: Default Fuel Per Mile data has been entered for existing projects to reflect the defaults already in those projects.

Mode Defaults for Fuel Per Mile and Congestion Ratios

With the inclusion of the Fuel Per Mile field, changes were made to the Manage Mode Default and Adjust Mode Factors screens on the Modes screen.

On the Manage Mode Default screen, the three Average Fuel Consumption fields have been dropped and replaced by three new fields: Congested to Free Flow Consumption Per Mile Ratio, Congested Hour to Congested Mile Ratio, and Fuel Per Mile.

| Purpose | Fuel Type | Congested to Free Flow Consumption Per Mile Ratio | Congested Hour to Congested Mile Ratio | Fuel Per Mile |
|----------|-----------|---|--|---------------|
| Business | Electric | 1.130 | 35.173 | 0.046 |
| Commuter | Electric | 1.130 | 35.173 | 0.046 |
| Personal | Electric | 1.130 | 35.173 | 0.046 |
| All | Electric | 1.130 | 35.173 | 0.046 |

Similarly, on the Adjust Mode Factors screen, which is used to set the defaults for the project, the three Average Fuel Consumption fields have been dropped and replaced by two new fields: Congested to Free Flow Consumption Per Mile Ratio and Congested Hour to Congested Mile Ratio.

| Facility | Mode | Purpose | Fuel Type | Congested to Free Flow Consumption Per Mile Ratio | Congested Hour to Congested Mile Ratio | Fuel Penalty for Ratio on Poor Pavement |
|----------|-------------------------|----------|-----------|---|--|---|
| Air | All Aircraft | All | Aviation | 1.000 | 36.889 | |
| Road | All Trucks | Freight | Diesel | 1.404 | 44.950 | 1.10 |
| Road | Bike | All | None | 0.000 | 0.000 | 2.00 |
| Road | Bus Rapid Transit (BRT) | Business | Diesel | 1.000 | 9.155 | 1.10 |
| Road | CNG Cars (Test) | All | CNG | 0.100 | 0.000 | 1.10 |
| Rail | Commuter Rail | Business | Diesel | 1.000 | 31.696 | |
| Road | Passenger Bus | Personal | Diesel | 1.000 | 11.768 | 2.00 |

Congested to Free Flow Consumption Per Mile Ratio shows the relationship of fuel used in congested conditions to fuel used in ordinary “free flow” conditions. Congested Mile to Congested Hour Ratio shows the relationship of fuel used per hour in congested conditions to the fuel used per mile in congested conditions. These are used as needed to adjust Fuel Per Mile in the model.

Updates to the Import Project Spreadsheet

As previously mentioned, changes have been made to the Project Import Spreadsheet. Some fields have been renamed to better describe the inputs.

The changes are identified below:

Mode Factors Tab:

| Old Column | Old | New Column | New |
|------------|--|------------|--|
| Y | Average Fuel Consumption all on/Mile (Free Flow) | Y | Congested to Free Flow Consumption Per Mile Ratio |
| Z | Average Fuel Consumption (Gallon/Mile (Congested)) | Z | Congested Hour to Congested Mile Ratio |
| AA | Average Fuel Consumption Gallon/Hour (Congested or Idle) | | |
| AB | Percent Fuel Penalty for Poor Pavement | AA | Fuel Penalty for Ratio on Poor Pavement |
| AC | Vehicle Operating Cost \$/mile (Free Flow) | AB | Vehicle Operating Cost \$/mile (Free Flow) |
| AD | Vehicle Operating Cost \$/mile (Congested) | AC | Vehicle Operating Cost \$/mile (Congested) |
| AE | Vehicle Operating Cost \$/hour (Congested or Idle) | AD | Vehicle Operating Cost \$/hour (Congested or Idle) |
| AF | VOC Penalty for Poor Pavement (%) | AE | VOC Penalty Ratio for Poor Pavement |
| AG | Percent VOT Penalty Ratio | AF | VOT Penalty Ratio |
| AH | \$ per Fatalities Accident | AG | \$ per Fatality |
| AI | \$ per Pers Injury Accident | AH | \$ per Injury |
| AJ | \$ per Property Damage Accident | AI | \$ per Crash-Involved Vehicle |
| AK | Other Societal Benefits (\$/veh-mile) Damage Accident | AJ | Other Societal Benefits (\$/VMT) |
| AL | Other Societal Costs (\$/veh-mile) Damage Accident | AK | Other Societal Costs (\$/VMT) |
| AM | Company Share | AL | Company Share |

Travel Demand Characteristics Tab:

| Old Column | Old | New Column | New |
|------------|---|------------|--|
| AA | Vehicle Road User Charge | AA | Fuel Per Mile |
| AB | Toll Charges per Trip | AB | Charge per Veh Mile |
| AC | Fee Per Passenger Trip | AC | Charge per Veh Trip |
| | | AD | Charge per Pass Trip |
| | | AE | Charge per Pass Mile |
| AD | Fatality Accident per 100m VMT | AF | Fatality per 100m VMT |
| AE | Pers Injury Accident per 100m VMT | AG | Injuries per 100m VMT |
| AF | Prop Damage Accident per 100m VMT | AH | Crash-Involved Vehicles per 100m VMT |
| AG | Fraction of Pavement in Poor Condition | AI | Fraction of Pavement in Poor Condition |
| AH | Hours Traveled with Adjusted VOT (Fraction) | AJ | Fraction of Hours Traveled with Adjusted VOT |

| | | | |
|------|----------------|------------|----------------|
| Key: | Deleted Fields | New Fields | Renamed Fields |
|------|----------------|------------|----------------|