A Survey and Analysis of Employee Responses to Employer-Sponsored Trip Reduction Incentive Programs

Technical Appendix B
TDM Evaluation Program User's Guide

CALIFORNIA ENVIRONMENTAL PROTECTION AGENCY

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7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) COMSIS Corporation 21311 Hawthorne Blvd., #230 Torrance, CA 90503			8. PERFORMING ORGANIZATION REPORT NUMBER R4364
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13. ABSTRACT *(Maximum 200 Words)*

The Technical Appendix B is a user-guide for a travel demand management (TDM) computer software developed from employee data collected in the Los Angeles and Sacramento areas of California. The Appendix describes software installation on an IBM PC, defines input data, and presents sample computer printout of the results. The TDM software provides a method of estimating the likely effects of various employer-based TDM strategies on average vehicle ridership for an employer's site.

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Contract No. A932-187

Prepared for:

California Air Resources Board
Research Division
2020 L Street
Sacramento, California 95814

Prepared by:

COMSIS Corporation
21311 Hawthorne Blvd., Suite 230
Torrance, California 90503

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reduction requirements of the South Coast Air Quality Management District (SCAQMD), and hence adheres to the definitions, conventions, and procedures of that regulation.

At the heart of the TDM Program is a five-mode logit mode choice model. The modes are: Drive Alone, Carpool, Vanpool, Transit, and Walk/Bike. Within the limitations of the available data, the model attempts to explain why commuters choose one travel mode over another. This model was developed using an extensive survey of employees in Los Angeles and Sacramento, supplemented by information from SCAQMD's Regulation XV database. Although no model can ever account for *every* factor which influences the mode choice of *every* individual, the model inside the TDM Program has been calibrated using the most rigorous techniques available. For more information about the model itself, see Appendix A.

Although the TDM Program is a leap forward in the evaluation of TDM incentives and strategies, it is subject to certain limitations which the user should bear in mind. The program cannot estimate an initial AVR for an employer – it requires a starting set of commute options, generally from a survey of employees (here, *commute options* refers to all possible choices, including commuting to work via a particular mode of travel, working at home, using a compressed work week, taking vacation, reporing sick, etc.). The program does not analyze the relationship between the input mode shares and the existing TDM incentives – it only estimates how the input mode shares (and AVR) are likely to change if new incentives are provided, existing incentives are modified, or incentives are better marketed, generally as part of the employer's TDM plan. There are dozens of actions that might convince commuters to use alternative travel modes (here, *alternative modes* refers to any commuting choice other than driving alone) or alternative work hours, but not all of them are represented in this program. This is because either these actions were not in common use when this project's surveys were performed, or the actions were found to be relatively ineffective in influencing mode choice, based on an examination of the entire database.

The TDM Program was written for a very specific group of users: people who are familiar with ETR programs (the Regulation XV program in particular) and who need to analyze proposed ETR plans to determine if the incentives that an employer would provide are sufficient to enable that employer to meet the applicable AVR target. The program is not intended for use by the general public, most transportation planners, or administrative personnel who are not familiar with ETR programs.

B.2   Program Installation

The TDM Program is distributed on one 3.5" floppy diskette. The program can be run from this floppy disk, but should be copied to a hard disk for faster performance. It is recommended that you create a new directory on your hard disk, such as C:\TDM, and copy all files from the floppy to the new directory. Your hard disk must have 300 Kb free space. You must then either: 1) always run the TDM Program from within that directory, or 2) change your DOS PATH command (usually in the AUTOEXEC.BAT file) to point to the directory in which the program is installed.

Appendix B   **TRAVEL DEMAND MANAGEMENT PROGRAM USER'S GUIDE**

Conditions of Use

1. The State of California makes no warranty of any kind, expressed or implied, with respect to the Travel Demand Management Program (Program), and specifically makes no warranty that the Program shall be merchantable or fit for any particular purpose; furthermore, any description of the Program shall not be deemed to create an expressed warranty, that the Program shall conform to the description. Moreover, the exhibition of any sample or model shall not create an express warranty that the whole program shall conform to the sample or model.

2. The Travel Demand Management Program may be used only as an aid in planning or as an evaluation tool since the Program was developed solely upon available data from the regions of California administered by the South Coast Air Quality Management District and the Sacramento Air Quality Management District. Consequently, any Travel Management Plan predicted by or generated from the Program are only estimates and WILL NEITHER ASSURE COMPLIANCE NOR BE DEEMED AS COMPLYING WITH ANY LOCAL, STATE OR FEDERAL TRANSPORT REGULATORY CONTROL. Furthermore, the results, estimates or predictions generated by the Program do not imply nor do they guarantee the extent of trip reductions suggested when incentives are offered to any or all groups of motorists.

3. The user of buyer of the Program agrees to indemnify, defend and hold harmless the State of California, its officers, agents and employees from and against any and all claims, liability, loss, damage or expense, including reasonable attorney's fees, arising from or by reason of the user's or the buyer's use, possession or acceptance of the program and payment therefore by the buyer.

4. Recipient assumes all risk and liability for any and all loss, damage, claims or expenses resulting from the use, purchase, or possession of the Program furnished in any manner whatsoever by the State of California.

B.1   Introduction

The Travel Demand Management (TDM) Program was developed to provide a way of estimating the likely effects of various employer-based TDM strategies on the average vehicle ridership (AVR) for an employer's site. It is intended that the program be used initially by public agencies who are charged with evaluating an employer's TDM plan, to determine if proposed incentives are likely to result in the employer meeting the applicable AVR target. Ultimately, the program could be used by employers themselves, as a way of evaluating their own employee trip reduction (ETR) strategies. By taking much of the guesswork out of estimating incentive impacts and helping employers quickly focus on incentives that work, the TDM Program should improve the effectiveness of TDM plans, as well as the efficiency with which they are prepared. This program was originally designed primarily to evaluate compliance with the Regulation XV trip

F2   Calc: calculates an employer's AVR and displays it in a window
PgUp   Prev: moves to the previous screen
PgDn   Next: moves to the next screen
F10   HotKeys: displays a window listing additional action and navigation keys

At almost any time during a session, pressing the F10 key displays a window listing all the program's hot keys:

Keys to Navigate Around the Program			
F1	Help for data entry	F10	Show this window
F2	Calculate Base and Plan AVR	Home	Jump to Screen 3
F3	Load Plan data	End	Jump to Screen 10
F4	Save Plan data	PgUp	Go to previous screen
F5	Create report	PgDn	Go to next screen
F6	Clear all data fields	Alt-q	Quit program
Keys to Navigate Around the Data Input Screens			
Tab or ↓	(Move to) next field	Shift-Tab or ↑	(Move to) previous field
Ctrl-a	(Move) left 1 word	Ctrl-f	(Move) right 1 word
Backspace	Delete 1 (character) left	Del	Delete 1 (character) right
Ins	Toggle Insert mode		

The usual sequence of steps in running this program is as follows:
1. Enter or import the data describing the employer, the site, and the employees by commute option on Screens 3-5, and any existing incentives on Screen 7. Press F2 to determine the Base AVR.
2. Select one or more new or modified alternative mode incentives (or disincentives to driving alone) on Screens 6-9. If there is (or will be) a clean fuel vehicle program, identify it on Screen 10.
3. Press F2 to calculate the change in AVR estimated to result from the change in incentives.
4. Repeat steps 2 and 3 as necessary.
5. Press F5 to create a report of the results. Press F4 to save the data to a file. Press Alt-q to exit the program.

B.4   Input Data

B.4.1   Data Entry Screens

The input screens are explained in the order in which they are displayed by the program. However, the user is not required to follow this sequence; after entering the Base employee commute option data on Screen 5, the user may fill in the other screens in any order.

The program runs only on IBM-compatible computers running the DOS operating system, with at least 560 Kb available RAM. The program will run under MS-DOS 5.0 and 6.0, and under Windows 3.1. EGA and VGA color monitors and Hercules black-and-white monitors are supported (a color monitor is highly recommended). Dot-matrix and laser printers are supported.

The following five files are required by the program:

ARBTDM.EXE	HELPSCR.DAT
REG15.PCX	HELPNDX.DAT
PARAM.DAT	

A sixth file, SAMPLE.R15, provides input data for a sample run of the program (see Section B.10).

B.3   Program Use

The user runs the program by typing

ARBTDM   <cr>

at the DOS prompt (<cr> = **Return** key). If a color monitor is being used, a colorful opening screen is shown and after about 2 seconds, pressing any key presents the first of two introduction screens.

The user navigates through the TDM Program mainly by using the **PgUp** and **PgDn** keys to move back and forth among the two introduction screens and eight input screens. These screens were designed to correspond to the Regulation XV plan forms. The screens are described as follows:

1. Introduction Screen 1: generally explains program operation
2. Introduction Screen 2: lists the screens and explains a typical sequence of steps in using the program
3. General Employer Information: enter some identifying information about this employer
4. Site Information: enter some data that describes this site
5. Base Employee/Vehicle Calculation: enter the Base (starting case) number of employees by commute option
6. Cost Incentives: enter any new financial subsidies or penalties or changes in parking cost
7. Existing Incentive Elements: identify whether or not certain incentives are already being provided
8. Proposed Incentive Elements: enter any new alternative work hours policies or identify other new incentives to use alternative modes
9. Other Elements: enter information on other incentives not covered in the previous screens
10. Clean Fuels Credit Worksheet: enter current and future numbers of clean fuel vehicles used by this site's employees

At the bottom of each screen is a list of the most important "hot keys":

F 1   Help: displays a window with further information on the current input screen

Screen 5: Base Employee/Vehicle Calculation

These values represent the number of employees reporting to work from 6:00 to 10:00 AM over a 5-day survey week. Thus, the total number of Employee Trips input on this screen must equal 5 times the Base number of Employees Reporting 6-10 AM that was input on Screen 4. If it does not, a warning will be issued. (Note that in this context, *Employee Trips* means an accounting of all employees who normally report to work 6-10 AM during the survey week, even if they did not actually travel to the work site that week.) Weekly Van Trips refers to the number of vanpool vehicle trips used by those employees who vanpool to the site. If there are any Vanpool employee trips, there should be at least some vanpool vehicle trips (otherwise a warning window will always be displayed). If the ratio of Vanpooling employees to Vanpool vehicles is less than 4 or greater than 20, a warning window is displayed and Parameter 51 is used as the actual vanpool occupancy. For further information and definitions, refer to the *Instructions and Plan Form* for The Commuter Program Trip Reduction Plan of the South Coast Air Quality Management District (January 1993).

Screen 6: Cost Incentives

Here, the user enters proposed *changes* in the cost of commuting by the travel modes listed. Cost changes are entered from the perspective of the employee. **Penalties and additional costs to the commuter are entered as positive changes; subsidies and cost reductions to the commuter are entered as negative changes.** All costs are entered in dollars and cents.

Subsidy/penalty changes are entered on the left as a cost per **employee** per **month**; the maximum such change is $300.00. Parking cost changes are entered on the right as a cost per **vehicle** per **day**; the maximum such change is $10.00.

In both cases, the user may indicate when each mode's incentive or penalty will go into effect, entered as the Days Implemented After Plan Approval. The default is 1, meaning that the incentive or penalty is presumed to go into effect immediately after plan approval. The maximum value is the number of days until the next plan review, which is coded as Parameter 57 (see Section B.8). Users should be careful to accurately reflect the most likely date that the incentive will be put in place.

All costs are converted to 1992 year dollars by factoring them by the ratio of the November 1992 U.S. Consumer Price Index (Urban Consumers, All Items) to the future CPI. The November 1992 CPI was 142.1 and the future CPI is Parameter 64 (see Section B.8). The default value of Parameter 64 is also 142.1, but in the future, this value should be changed to reflect the CPI for the year in which the program is being applied. For example, if the CPI in 1996 is 160.0, then a $3.00 parking charge in 1996 is equivalent to $2.66 in 1992 dollars (= 3.00 * 142.1/160.0).

A separate incentive or penalty cannot be entered for 5- or 6-person carpools. All changes entered for 4-person carpools will be applied to 5- and 6-person carpools as well.

Screen 7: Existing Support Elements

The TDM model research identified eight "soft" alternative mode incentives (see Section B.7). On this screen, the user identifies whether or not each of these incentives was provided by this employer at the time of the survey. If an incentive was offered, enter a "y" (or "Y") on the line next to that incentive. (This screen does not allow for "partial" incentives. It is supposed to reflect incentives that were available to all employees, preferably for the 12 months prior to the survey.)

Screen 3: General Employer Information

Employer name and address are not required, but are very helpful for keeping track of the data. A maximum of 25 characters may be input for the employer's name and up to 4 lines of address information.

For new input, the date is entered automatically as today's date. If an existing file is imported, the date on which that file was created is inserted.

The Reviewer should enter his or her name or initials (max. 17 characters) and any Comments (max. 50 characters) that pertain to this run.

The Site Identifier and Plan Sequence number are not required, but are used to create a file name if the user desires to save the input data. Default values of 0 and 1, respectively are provided by the program. Any value from 0 to 999999 may be entered for the Site Identifier and any value from 1 to 99 may be entered for the Plan Sequence number.

An AVR Target value is required. The default is 1.5 and the value must be between 1.0 and 2.0.

The employer's SIC Code (Standard Industrial Classification) must be entered next. This is a four-digit number that identifies the type of employer this is.

Quotation marks ("" or '') must not be included in any of these fields.

Screen 4: Site Information

On this screen, "Base" refers to the existing condition and "Plan" refers to the condition that is projected to exist by the end of the next plan review period. *In every input field of this screen, if the Plan value is left blank (or entered as zero), the program will fill it in with the Base value.*

Total Employees refers to the total number of employees at this site.

Employees Reporting 6-10 AM refers to the number of employees who report to work from 6:00 to 10:00 AM during the survey week. This value cannot exceed the number of Total Employees.

Total Parking Spaces include all spaces available to employees, whether owned or leased, on-site or off-site. This value may not be less than 1.

Marketing Cost of ETR Pgm. is the total amount spent per year to market the employee trip reduction program. This includes brochures, fairs, and other forms of advertising and promotion.

Administrative Cost of ETR Pgm. is the total amount spent per year to administer the employee trip reduction program. This includes staff, benefits, office supplies, etc.

The maximum allowable increase for the sum of annual marketing and administrative cost per employee is $25.00 (in 1992 dollars). If the user enters values which cause this limit to be exceeded, the program displays a warning message and recalculates the Plan marketing and administrative costs proportionately until the limit is reached.

No. of Retail Land Uses Nearby refers to the number of individual retail land uses within 1/2 mile of the employer's site. This includes a bank, dry cleaner, video store, pharmacy, convenience store, grocery store, restaurant, or shopping center (a shopping center or mall must be counted as *one* land use). Note that two establishments of the same type (two restaurants, say) count as one land use. Neither the Base nor Plan value may exceed 10. The most important value here is the *difference* between the Base and Plan values, not the absolute number.

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Modes That Are Affected: the user must identify which mode(s) will be affected as a result of each element. This is done by entering a string of up to 4 mode abbreviations, separated by commas. The mode abbreviations are as follows: DA=drive alone, MC=motorcycle, 2P=2-person carpool, 3P=3-person carpool, 4P=4-, 5-, and 6-person carpool, VP=vanpool, TR=transit, BK=bicycle, WK=walk, CP=all carpool modes. Upper or lower case may be used and the order in which the modes are entered is not important.

It is the user's responsibility to ensure consistency between the element description, its effectiveness, and the modes that will be affected.

Table B-1
Relative Effectiveness of TDM Program Incentives

Incentive Change	Approximate Relative Effectiveness (1-10)
1 retail land use on-site or nearby	10
preferential parking for ridesharers	8
transportation coordinator PLUS matching program	7
$4/month transit fare subsidy	6
prizes, free meals, certificates	5
$2/month parking tax for single-occupant autos	4
$1/month rideshare subsidy	3

Screen 10: Clean Fuels Credit Worksheet

Some ETR programs give extra AVR credit if employees commute to the site in vehicles powered by alternative energy sources. These include liquified petroleum gas (LPG, or propane), compressed natural gas (CNG), methanol (operating on at least 85% methanol fuel), and electric vehicles. Screen 10 provides for entering the Base and Plan number of commuter vehicles by energy source. In contrast to Screen 3, if Base values are entered but Plan values are not, the Plan values are left blank (zero), and a warning is issued. For further information and definitions, refer to the *Instructions and Plan Form* for The Commuter Program Trip Reduction Plan of the South Coast Air Quality Management District (January 1993). Note that after 1994, it is likely that credit for clean fuel vehicles will no longer be allowed when calculating AVR. The policy on this may vary by air quality district and users are urged to confirm that such credits are allowable before data are entered on this screen.

B.4.2   Importing Data

Generally, the user will enter the data on these screens by typing in values at the keyboard. However, the program also allows the user to "import" data from two different types of files, via the F3 key. These are referred to as *.R15* files and *.DBF* files. Pressing F3 brings up a window asking which type of file the user wants to load data from. (If the user has not saved the data currently entered, a window is displayed warning that the data about to be loaded will overwrite the data already entered, and asking the user to confirm that this is what is desired.)

Screen 8: Proposed Support Elements

There are two parts to this screen. In the top part, the user enters the Base and Plan number of employees who are eligible to participate in any of four Alternative Work Hours (AWH) programs. If any employees were listed in Screen 5 as having used an AWH option, it is presumed that some employees *must* be eligible for AWH, and the user must enter a non-zero number on Screen 7, corresponding to the AWH option shown on Screen 5. It is assumed that on average, Telecommuters telecommute 1.8 days/week and travel to the worksite 3.2 days/week. This can be adjusted by changing Parameter 52 (see Section B.8).

In the bottom part, the user identifies the *new* TDM strategies shown by entering a non-zero value for Number of Employees Eligible. It bears emphasis that Number of Employees Eligible is defined as the number of employees (up to the limit of Total Employees) who will be allowed to use the incentive shown, **not the number who will actually use the incentive**. In most cases, this will be the number of Total Employees. (An exception might be the case in which an incentive is offered to all employees in a particular department or on a particular floor of a building, but is not offered to all the employer's employees.) In order to take an incentive away, the user should enter a negative number of employees, representing the number of employees who will no longer be eligible for the incentive.

In the case where two actions are linked by the word "PLUS", *both* actions must be implemented in order to receive credit. No partial credit is given for implementing one or the other alone, *except* in the case where the employer already offers one of the actions and proposes to newly implement the other one as part of his Plan. In the case where two actions are linked by the word "OR", credit is given if *either* action is implemented (but no extra credit is given for implementing both actions).

Screen 8 is for new incentives only. It is not permitted to enter a "y" for an incentive on Screen 7 and also enter a non-zero Number of Employees Eligible for that same incentive on Screen 8.

As in Screen 6, the default implementation date is the day after plan approval, but other values may be entered.

Screen 9: Other Elements

Although the actions listed on Screens 6-8 are those that the model calibration indicated were effective in reducing vehicle trips, it is possible that other TDM incentives might be considered in the future that could turn out to be just as effective as those already recognized by the TDM Program. Screen 9 allows the user to enter up to 5 additional incentives, by providing the following data for each:

Element Description: text description of the incentive (max. 25 characters, no quotation marks).

User-Estimated Effectiveness: a value of 1 (low) to 10 (high), based on the user's estimate of the likely effectiveness of the incentive. A "1" is roughly equivalent to a ridesharing subsidy of $0.30 per month, while a "10" is roughly equivalent to a ridesharing subsidy of $3.00 per month. Table 1 below presents the relative effectiveness of some of the other TDM incentives included in the program. An average value for Plan awareness (i.e., the average calculated for the other soft incentives) is applied to all user-entered incentives.

Number of Employees Eligible: defined as in the other screens.

Days Implemented After Plan Approval: defined as in the other screens.

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For each AWH option, the ratio of the Plan to the Base eligible employees is multiplied by the Base number of employees who actually chose an AWH option, as indicated on Screen 5:

$$\text{Plan AWH Users} = \text{Base AWH Users} * \frac{\text{eligible Plan AWH employees}}{\text{eligible Base AWH employees}}$$

This calculation is done first, before any mode shift adjustments are applied. Also, in performing this calculation, a fixed value is assumed for the number of days per week that the average telecommuter telecommutes. The default value is 1.8, based on research by others, but this is changeable by editing the PARAM.DAT file (Parameter 52) – see Section B.8.

If the employer did not have an AWH program, but plans to have one in the future, a different technique is used. Analysis of the Regulation XV database has provided default "participation rates" for the four AWH options:

- telecommuting 71%
- 3/36 work week 27%
- 4/40 work week 28%
- 9/80 work week 35%

For example, 35% of all employees who were offered a 9/80 work week actually chose that option.

If the number of AWH-eligible employees is zero in the Base but non-zero in the Plan, these percentages are multiplied by the number of eligible Plan employees to estimate the likely usage of each AWH option. These percentages are changeable by editing the PARAM.DAT file (Parameters 53-56) – see Section B.8.

B.5.2 Incentive Awareness

Research for this project and other TDM studies has identified that employer-provided alternative mode incentives are not effective unless employees are *aware* that such incentives exist. The biggest improvements in AVR are invariably associated with employers who not only offer reasonable TDM incentives, but who also advertise and promote them to their employees. Note that awareness of an incentive is not the same as using it: in this context, *awareness* means that employees know that the incentive exists. Whether or not an incentive is applicable to them and whether or not they actually take advantage of the incentive are separate matters. In the TDM Program, awareness refers to the percentage of employees who are aware that a particular incentive is being offeredto them. It is determined separately for each incentive, for Base and Plan conditions.

Accurately determining employees' awareness of particular TDM incentives is a difficult task, requiring an extensive, detailed survey that is beyond the scope of the normal employee travel mode survey. As a result, the TDM Program includes an "awareness sub-model" that produces an estimate of this employer's employee awareness of each incentive. This sub-model is based on the same data collected for the main mode choice model and estimates percentage awareness for each

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.R15 Files

Once data has been entered into the screens, pressing F4 saves all of the input data to a small plain text file (see below), which always has the extension .R15. Data which has been saved to an .R15 file can be re-loaded into the program at any time. After pressing F3 and selecting the .R15 file type, the program presents the user with a list of available .R15 files in the current directory. The user may search other directories or disks for other .R15 files, if desired. Once the desired file is located, pressing Enter loads the data into the program.

.DBF Files

The South Coast Air Quality Management District maintains a series of databases containing information from Regulation XV ETR plans submitted by employers. Three of these files, presently named COMPANY.DBF, AVR.DBF, and CLEAN.DBF, contain much of the data for Screens 3-5, and the TDM Program can extract that data from those files. After pressing F3 and selecting the .DBF option, the program presents a window in which the user must enter the Site Identifier and Plan Sequence Number of the desired plan (this presumes that the user has previously identified the Site ID and Sequence No. for the desired plan).

The program usually takes a few seconds to search through the three databases and extract the necessary information. If the necessary record is missing or deleted in any of the three files, the program will so inform the user (since most employers do not have a clean fuel vehicle program, the software will usually issue a warning to that effect and advise the user that any clean fuel vehicle data will have to be entered manually).

B.5   Calculation Methodology

The TDM Program uses two techniques to estimate the likely effects of TDM strategies, a rather straightforward method for Alternative Work Hours usage and a more complex method for the true commuting travel modes. In addition, a third procedure is used to estimate the awareness of employees to TDM incentives.

B.5.1   Alternative Work Hours

There are four AWH options in common use in California: telecommuting, 3/36 work week (3 days, 12 hours/day), 4/40 work week, and 9/80 work week (1 day off every two weeks). Research has indicated that the use of AWH options may not be well-suited to choice-based modelling, because the employee's selection of an AWH option is so closely tied to the AWH policies of the employer. Thus, the TDM Program requires the user to quantify the employer's AWH policy by entering the Base and Plan number of employees who are now eligible and who will be eligible to participate in each of the four AWH options (Screen 7). These options are mutually exclusive. That is, the sum of the employees who are eligible for these options must not exceed the Total Employment. It is presumed that an employee will not generally be eligible for both Telecommuting and 4/40 Work Week, for example, and even if he is, the employee will likely choose one or the other.

where:

P'_i = new mode i share

P_i = original mode i share

ΔU_i = change in disutility of mode i = $C_1 * \Delta Cost + C_2 * \Delta Incentive_1 + C_3 * \Delta Incentive_2 * A_{2p} + \ldots$

C_1, C_2, etc. = calibrated coefficients

A_{1p}, A_{2p}, etc. = estimated Plan awareness percentages for the soft incentives

Δ = change in attribute (ΔIncentive means that an incentive is proposed to exist where it did not before)

The key attribute of the incremental logit model is that all of the current (Base) characteristics of the employer, the site, the employees, and the transportation system are represented by the starting (Base) mode share. The TDM Program combines the calibrated coefficients with the change in cost and incentives input by the user to pivot off of the starting mode shares using the above equation.

One of the deficiencies of the incremental logit model is that it cannot pivot off of a starting mode share of zero. To remedy this, the TDM Program checks to see if the user has identified specific modal incentives for a travel mode for which there were no users in the Base data. In this case, the program supplies a "seed" modal share – a small value that has been derived from the Regulation XV database. This share is used to provide a starting point from which the mode choice model can pivot to reflect changes in incentives. These "zero mode seeds" are changeable by editing the PARAM.DAT file (Seed Values 1-10) – see Section B.8. After using the seed value and the new incentive to calculate a new mode share, the seed value is subtracted from the new share, leaving a "residual" mode share that is more likely to be of an appropriate magnitude for the circumstances.

B.6.   Program Outputs

The primary program output is the **window** that is presented when F2 is pressed, showing the Base AVR for the input survey data and the Plan AVR that is estimated to result from the incentives that have been entered. If the estimated Plan AVR value exceeds the input target AVR value, the window is colored green. If not, the window is colored red. Pressing the Enter key removes the window.

The program also produces a **report**, which is generated by pressing the F5 key (this also recalculates the Plan AVR). The user is then presented with a window that provides the following options:

• The user may print the report, save it to a text file, or both.

• If the report is being saved to a text file, a file name is required. A default file name is presented, composed of the Employer ID, Plan Sequence No., and the extension .PRN. Any legal DOS file name, with path information, may be entered here.

• If the report is being sent directly to a printer, a printer setup string may be provided. This will generally not be necessary, but permits the user to use different print features that are unique to the user's printer. The program automatically sends an Esc(ape) code before sending this setup string.

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of 8 incentives as a function mainly of the annual ETR marketing and administrative cost per employee. As noted above, this includes brochures, fairs, and other forms of advertising and promotion, as well as salaries, benefits, and other costs of program administration. Two other variables play a small role: employer's SIC Code and size (Total Employees).

The estimated awareness is used to adjust the sensitivity of the mode choice model to the presence of the 8 soft incentives (see Section B.7). This is done in two ways. First, the *change* in awareness from Base to Plan is used to give additional credit for any soft incentives that are already in place. In effect, this reflects a greater influence of existing incentives, if the employer increases his annual budget for marketing and/or administering his ETR program. Second, the estimated Plan awareness values are used to determine the sensitivity of employees to any new incentives that are proposed. This reflects the fact that without a substantial marketing effort, it is likely that many employees will remain unaware of new incentives, and thus their impact will not be significant. Thus, the marketing and administrative costs that are entered on Screen 4 produce an indirect, but important influence on mode share.

The awareness percentages are applied only to the 8 soft incentives. The available research suggests that the awareness of hard (financial) incentives is not as important an issue. For more information on the awareness sub-model, see the Model Development report.

B.5.3 Commuting Mode Shifts

After the AWH usage has been accounted for, the program next estimates any shifts among the 11 actual travel modes: Drive Alone, Motorcycle, 2-Person Carpool, 3-Person Carpool, 4-Person Carpool, 5-Person Carpool, 6-Person Carpool, Vanpool, Transit, Bicycle, and Walk. This shift is calculated by applying the logit mode choice model in *pivot point* fashion (also known as the *incremental logit* model). The most significant feature of this approach is that the complete characteristics of the employer, employee, and travel conditions need not be known. All that is necessary is to have a starting mode share (provided by the employee survey) and the **change** in travel disutility for the site that would result from implementing the ETR plan under consideration. The change in travel disutility is simply the product of the logit coefficient(s) and the change(s) in travel conditions. In this case, the travel conditions that are most easily influenced by the employer are cost and the presence of certain incentives.

A discussion of the theory of logit mode choice modelling is beyond the scope of this document, but the interested reader is referred to *Discrete Choice Analysis: Theory and Application to Travel Demand*, by M. Ben-Akiva and S. Lerman (1985). The logit model developed as part of this project is documented in the *Model Calibration Report*. From the basic logit equation, it can be shown that the new probability of choosing a travel mode is given by:

$$P'_i = \frac{P_i * e^{\Delta U_i}}{(e^{\Delta U_i} - 1) * P_i + 1}$$

incentives. The TDM Program includes eight such incentives, shown on Screens 7 and 8 and defined below:

• *Transit Information Center PLUS Bus Pass Sales*

The employer would provide a central location where employees could obtain transit route, schedule, and fare information. In addition, the employer would sell transit passes at the work site (if the employer also discounts the passes, the discount is reflected in a modal subsidy on Screen 6). Obviously, this is only applicable if the work site is (or will shortly be) served by a transit route. This incentive affects the transit mode.

• *Use of Company Vehicles by Ridesharers*

Employers which maintain a fleet of vehicles would make them available for use by ridesharers for midday errands, lunch trips, etc. This incentive affects all ridesharing modes (carpool and vanpool).

• *Bike Racks/Storage OR Showers and Lockers*

The employer would provide *either*: a) a place where employees could shower and change clothes after riding a bicycle or walking to work, or b) a convenient, covered place where employees who bicycle to work could store their bicycles during the day. Enough spaces must be set aside to accommodate all bicyclists. This incentive affects the bike/walk mode.

• *Guaranteed Ride Home*

The employer would provide a means of transporting employees home if they did not drive to work that day. They might need this service to return home for midday emergencies or if they are required to work late at night and miss their ride or the last bus. Usually, taxicabs or employer fleet vehicles are used for this purpose. This incentive affects all alternative modes.

• *Preferential Parking for Ridesharers*

The employer would reserve parking spaces close to the building entrance for use exclusively by carpools and vanpools. This is particularly effective if such spaces are clearly marked as being reserved, and are under cover. Enough spaces must be set aside to accommodate all ridesharing vehicles. This incentive affects all ridesharing modes (carpool and vanpool).

• *Transportation Coordinator PLUS Rideshare Matching*

One of the usual requirements of an ETR program is for employers to designate an Employee Transportation Coordinator (ETC), whose job it is to facilitate the use of alternative modes by employees. This project's research has indicated that an ETC is most effective if the employer also provides a rideshare matching program. Partial credit is not available for this incentive – both elements must be provided. This incentive affects all ridesharing modes (carpool and vanpool).

• *Company-Provided Vanpools*

The employer would provide vans to facilitate the formation of vanpools. This consists of purchasing or leasing the vehicles, and arranging for insurance and maintenance. Vanpool riders would pay a monthly fare that would cover these costs – by providing the vans, the employer is merely enhancing the convenience of vanpooling. (If the employer also subsidizes all or part of the

• The user may create a short version of the full report, which is the first two pages of the full report. This gives the basic employer information, Base and Plan AVR calculation, and the Plan estimated trips by mode.

A sample report is shown in Section B.10. If the report is to be sent directly to the printer, the screen will become partially blank for a few seconds while the data is being sent to the printer. Note that the date at the bottom of each report page is the date on which the report was created, while the "File Date" shown on page 1 of the report is the date on which the original input file was created.

The final output option is to save the input data in a small text **file**. Pressing F4 displays a window in which the user enters a name for this file. A default name is already offered, composed of the 6-character Employer ID (with leading zeroes) plus the 2-character Plan Seqence Number (also with leading zeroes). The user may enter any legal DOS file name. The file extension is always ".R15". If a file with the same name already exists in the current directory, it will be overwritten without warning. This file contains all of the data that has been entered on the input screens. A sample of this file is shown in Section B.10.

B.7.   Incentives

The effort to calibrate the logit mode choice model that is inside the TDM Program examined numerous incentives for commuters to use alternative modes. As a result of Regulation XV, Southern California employees probably have the widest range of such incentives available. The annual Regulation XV surveys by employers and the special surveys conducted for this project yielded information that starts to provide a better understanding of which incentives are more effective than others. Only those incentives which proved to be the most effective are used in the TDM Program.

Financial incentives and disincentives have consistently ranked as the most effective TDM actions. From an employer's perspective, financial incentives are generally imposed through two techniques: direct modal subsidy or penalty, and parking surcharges or rebates. The direct modal subsidy/penalty is simply a periodic payment to commuters who choose to use one of the alternative travel modes. Conversely, employers may opt to impose a periodic penalty (tax, fee, etc.) on commuters who drive alone. An employer might offer something other than money, but which has a easily recognizable cash value. If that item is provided on a recurring basis and its cash value can be readily determined, then it might be considered equivalent to cash. These incentives are entered on the left side of Screen 6.

Parking charges and rebates are slightly more effective than modal subsidies. This is usually implemented as an extra daily or monthly charge for vehicles with one occupant, perhaps coupled with rebates for vehicles with more than one occupant. These incentives are entered on the right side of Screen 6.

Research has indicated that there are some *soft* (i.e., non-financial supportive) measures that can influence commuters to change travel modes, especially when combined with financial

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```
C   3  Financial Incentive                      TR          -0.00609
C   4  Financial Incentive                      BW          -0.0125
C   5  Parking Cost                             DA, RS      -0.00855
C   6  Parking Spaces/Total Employee            TR          -0.4155
C  10  No. of On-Site Retail Land Uses          CP           0.1069
C  11  No. of On-Site Retail Land Uses          TR           0.1069
C  12  Preferential Parking for Ridesharers     RS           0.1214
C  13  Company-Provided Vanpools                VP           2.5860
C  14  Use of Company Vehicles by Ridesharers   RS           0.7861
C  15  Transp. Coord. PLUS Rideshare Matching   RS           0.0777
C  20  Guaranteed Ride Home                     RS,TR,BW     0.4476
C  21  Transit Info Center PLUS Bus Pass Sales  TR           1.0830
C  23  Bike Racks/Storage OR Showers/Lockers    BW           0.4056
C  25  Prizes, Free Meals, Certificates         RS, TR       0.0826
```

B.8.3   Awareness Sub-Model Coefficient Section

This group of parameters are the coefficients of the awareness sub-model within the TDM Program. **These coefficients were derived from a detailed model calibration effort and they should not be changed without a thorough understanding of the implications for the results. Any coefficient changes must be documented.**

```
Awareness Sub-Model Coefficients
A   1  Transit Info/Pass Sales: constant                       0.1056
A   2  Transit Info/Pass Sales: slope                          0.0064
A   3  Bike Racks OR Showers: constant                         0.5035
A   4  Bike Racks OR Showers: slope                            0.0007
A   5  Guaranteed Ride Home: SIC Code cutoff                4800
A   6  Guaranteed Ride Home: employment cutoff               300
A   7  Guaranteed Ride Home: logit bound                       0.78
A   8  Guaranteed Ride Home: logit constant                    0.7880
A   9  Guaranteed Ride Home: logit coefficient                -0.0267
A  10  Guaranteed Ride Home: linear constant                   0.0
A  11  Guaranteed Ride Home: linear slope                      0.0011
A  12  Preferential Parking for Ridesharers: bound             0.82
A  13  Preferential Parking for Ridesharers: constant         -0.3514
A  14  Preferential Parking for Ridesharers: coefficient      -0.0273
A  15  Transp. Coord. PLUS RS Matching: employment cutoff    200
A  16  Transp. Coord. PLUS RS Matching: logit bound            0.92
A  17  Transp. Coord. PLUS RS Matching: logit constant         0.7267
A  18  Transp. Coord. PLUS RS Matching: logit coefficient     -0.1149
A  19  Transp. Coord. PLUS RS Matching: linear constant        0.2663
A  20  Transp. Coord. PLUS RS Matching: linear slope           0.0015
A  21  Company-Provided Vanpools: constant                     0.0
A  22  Company-Provided Vanpools: slope                        0.0047
```

fare, this would be reflected as a modal subsidy, as discussed above.) This incentive affects the vanpool mode.

• *Prizes, Free Meals, Certificates*

The employer would offer prizes, free meals, or gift certificates on a regular basis to employees who rideshare or use transit. These are assumed to be items of nominal value – if valuable items are involved, it may be appropriate to establish the cash value of the item and enter it as a financial incentive. This incentive affects the ridesharing and transit modes.

In addition to the specific financial and supportive incentives listed above, the TDM Program is sensitive to some additional attributes of the work site that the research indicated have an influence on alternative mode usage:

◊ *Parking Spaces per Employee*

If an employer provides fewer parking spaces, generally, fewer employees will drive to work. Although this did not turn out to be a sensitive variable in the model calibration, the program will estimate slightly increased transit use if spaces/employee are reduced.

◊ *Number of Retail Land Uses*

Employees often cite their need for a car to run midday errands as a reason for driving to work. This research indicated that the presence of retail land uses at the work site is associated with greater carpool and transit use. As noted above, these retail land uses include a bank, dry cleaner, video store, pharmacy, convenience store, grocery store, restaurant, or shopping center (a shopping center or mall count would each be counted as *one* land use).

B.8.   Parameters

The TDM Program uses several *parameters*, which are numeric constants and file names that generally will not vary from run to run, but which the user may find necessary to modify over time. For that reason, they have not been "hard coded" in the program, but are input via the PARAM.DAT file. This is a plain text file that can be edited with any text editor or word processor (using plain text or ASCII format). The PARAM.DAT file is listed and annotated below.

B.8.1   Mode Choice Model Coefficient Section

The first group of parameters are the coefficients of the logit mode choice model within the TDM Program. **These coefficients were derived from a detailed model calibration effort and they should not be changed without a thorough understanding of the implications for the results. Any coefficient changes must be documented.**

```
Travel Demand Management Program Parameters   27 Jul 93

Mode Choice Model Coefficients
C   1   Financial Incentive              DA          -0.0125
C   2   Financial Incentive              RS          -0.0125
```

```
P  20   AVR DBF field no. containing CAR2                              8
P  21   AVR DBF field no. containing CAR3                              9
P  22   AVR DBF field no. containing CAR4                             10
P  23   AVR DBF field no. containing CAR5                      (not used)
P  24   AVR DBF field no. containing CAR6                      (not used)
P  25   AVR DBF field no. containing VAN                             11
P  26   AVR DBF field no. containing VAN_COUNT                       12
P  27   AVR DBF field no. containing TRANSIT                         15
P  28   AVR DBF field no. containing WALK                            16
P  29   AVR DBF field no. containing BIKE                            17
P  30   AVR DBF field no. containing TELE                            18
P  32   AVR DBF field no. containing NON                             20
P  33   AVR DBF field no. containing COM_3_36                        21
P  34   AVR DBF field no. containing COM_4_40                        22
P  35   AVR DBF field no. containing COM_9_80                        23
P  36   AVR DBF field no. containing VAC                             25
P  37   AVR DBF field no. containing SICK                            26
P  38   AVR DBF field no. containing OTHERS                          27
P  39   AVR DBF field no. containing AVR_TAR                         32
P  40   CLEAN DBF field no. containing COMPANY_ID                     1
P  41   CLEAN DBF field no. containing PLAN_SEQ                       2
P  42   CLEAN DBF field no. containing LPG                            8
P  43   CLEAN DBF field no. containing METHANOL                       9
P  44   CLEAN DBF field no. containing CNG                           10
P  45   CLEAN DBF field no. containing ELECTRIC                      11
P  46   LPG clean fuel credit factor                               0.50
P  47   Methanol clean fuel credit factor                         0.67
P  48   CNG clean fuel credit factor                              0.75
P  49   Electric vehicle clean fuel credit factor                 0.80
P  50   CGA snow suppression (0=yes, <0=def.=don't suppress)         -2
P  51   Default average vanpool occupancy                           8.8
P  52   Average days/week that Telecommuters telecommute           1.0
P  53   Default Telecommuting participation rate                  0.71
P  54   Default 3/36 Schedule participation rate                  0.27
P  55   Default 4/40 Schedule participation rate                  0.28
P  56   Default 9/80 Schedule participation rate                  0.35
P  57   Days before next plan submittal                            365
P  58   COMPANY DBF field no. containing OWN_ONSITE                132
P  59   COMPANY DBF field no. containing LES_ONSITE                133
P  60   COMPANY DBF field no. containing OWNOFFSITE                134
P  61   COMPANY DBF field no. containing LESOFFSITE                135
P  62   COMPANY DBF field no. containing OTHOFFSITE                136
P  63   COMPANY DBF field no. containing SIC                        23
P  64   U.S. Consumer Price Index (Urban), Future               142.1
```

```
A  23  Prizes, Free Meals, Certificates: bound            0.80
A  24  Prizes, Free Meals, Certificates: constant         0.9
A  25  Prizes, Free Meals, Certificates: coefficient     -0.0800
```

B.8.4   File Section

This section contains the file names of the SCAQMD Regulation XV database files from which information can be extracted. If these files are located elsewhere, then these entries must be edited to indicate their location (drive and directory).

```
File Names
F   1   name of DBF containing employer data           company.dbf
F   2   name of DBF containing AVR data                avr.dbf
F   3   name of DBF containing clean fuel vehicle data  clean.dbf
```

B.8.5   Miscellaneous Parameter Section

Most of this section contains the field numbers of those items in the Regulation XV database that are used in the TDM Program. For example, COMPANY_ID is currently the name of the second field in the COMPANY.DBF database file. It does not matter if the *name* of this field changes, but if its *position* in the file changes, then that must be reflected here. If the structure of the Regulation XV database changes, then these parameter values must be re-checked and edited if necessary. Parameters 46 - 57 are other values used by the program.

```
Miscellaneous Parameters
P   1   COMPANY DBF field no. containing COMPANY_ID      2
P   2   COMPANY DBF field no. containing PLAN_SEQ        3
P   3   COMPANY DBF field no. containing CO_NAME         6
P   4   COMPANY DBF field no. containing SI_ST_NO        12
P   5   COMPANY DBF field no. containing SI_ST_PREF      13
P   6   COMPANY DBF field no. containing SI_ST_NAME      14
P   7   COMPANY DBF field no. containing SI_ST_TYPE      15
P   8   COMPANY DBF field no. containing SI_ST_UNIT      16
P   9   COMPANY DBF field no. containing SI_LOC          17
P  10   COMPANY DBF field no. containing SI_CITY         18
P  11   COMPANY DBF field no. containing SI_STATE        19
P  12   COMPANY DBF field no. containing SI_ZIP          20
P  13   COMPANY DBF field no. containing SRA             24
P  14   COMPANY DBF field no. containing TOT_SITE        27
P  15   COMPANY DBF field no. containing TOT_6_10        28
P  16   AVR DBF field no. containing COMPANY_ID          1
P  17   AVR DBF field no. containing PLAN_SEQ            2
P  18   AVR DBF field no. containing CAR1               6
P  19   AVR DBF field no. containing MOTORCYCLE          7
```

program will try to continue anyway. If the user ignores this window, the accuracy and logic of the results cannot be assured. A red window labelled <ERROR> indicates a more serious problem with the input data or program operation. The program will not permit the user to proceed further until the problem is corrected. In either of those cases, pressing the Enter key removes the window.

A red window showing <Go Ahead> and <Cancel> at the bottom indicates that the user is about to take some action which could cause data loss or other unintended consequences. Selecting <Go Ahead> allows the action to continue, while <Cancel> aborts the action.

B.9.3   Quitting the Program

The user quits the program by pressing Alt-q (the **Alt** key and the **q** key simultaneously). The program asks for confirmation, whereupon if the user presses the **y** or **Y** key (no Enter key needed), the program ends.

B.10   Sample Run

A sample input file has been prepared (SAMPLE.R15) to help the user become familiar with the TDM Program. This file is for a hypothetical employer with a surveyed starting AVR of 1.21 and 300 employees. A sample of the full report for this case is listed below, showing the input data, proposed incentives, and estimated AVR results.

This employer *currently* provides these incentives: Use of Company Vehicles by Ridesharers and Prizes, Free Meals, Certificates. This run of the program tests the following actions that the employer proposes for the coming year:
- *Increase* in annual ETR marketing cost from $3,000 to $6,000.
- *Increase* in annual ETR administrative cost from $5,000 to $6,000.
- Construction of a *new* restaurant on-site.
- *New* subsidy of bus passes in the amount of $10.00 per month.
- *New* subsidy of $5.00 per month for commuters who bike or walk to work.
- *Increase* in the parking cost for single-occupant vehicles from $0.25 per day to $0.75 per day, to be implemented 6 months later.
- *Increase* in the number of employees eligible for Telecommuting from 5 to 20.
- *New* transit information office, which distributes route, fare, and schedule information and sells bus passes.
- *Expansion* of current preferential parking spaces for rideshare vehicles to cover the remaining half of the parking lot so that all ridesharers will have access to the reserved spaces (only half of the lot is so covered today).
- *New* program of providing vans for the use of vanpoolers.
- *New* program of general start-up assistance for vanpools, estimated to have a relative effectiveness of 5.
- Vehicle fleet to acquire 20 *new* compressed natural gas vehicles, to be used by commuters for testing purposes.

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B.8.6 Seed Value Section

This section contains the "seed" values to be used if the travel mode shown has a starting (survey) share of 0.0%, but the user wishes to reflect an increase in that share as the result of a specific incentive for that mode. These values were derived from experience with the first three years of Regulation XV plan data. They are expressed as a proportion, so for example, the seed share for 3-person carpools is 2.5% of total actual commute trips.

```
Zero Mode Seed Values
S    1   3-person pool                                       0.025
S    2   4-person pool                                       0.008
S    3   vanpool: < 400 employees                            0.001
S    4   vanpool: 400+ employees                             0.016
S    5   public transit: Downtown (1.75 AVR area)            0.160
S    6   public transit: all other areas                     0.029
S    7   walk: < 400 employees                               0.015
S    8   walk: 400+ employees                                0.010
S    9   bike: Downtown (1.75 AVR area)                      0.002
S   10   bike: all other areas                               0.009
```

Extra "comment" lines may be placed in the PARAM.DAT file for documentation purposes, as long as the first column of such lines is blank. This file has a fixed-column format, as follows:

columns	item
1 - 1	parameter section indicator (C, F, P, or S)
2 - 5	parameter number
6 - 60	parameter description
61 - 71	parameter value

B.9 Miscellaneous

B.9.1 Help Windows

The TDM Program provides on-line help for each screen or window where user input is required. Pressing F1 displays the help window and pressing any key removes it. The help window information is stored in two binary files: HELPSCR.DAT and HELPNDX.DAT, which must be in the same directory as the program.

B.9.2 Error/Warning Windows

The program performs extensive checking for improper input values and other conditions which would lead to illogical results (for example, any combination of circumstances that would result in an AVR exceeding 9.99). Three types of notification are given to the user. A yellow window labelled <WARNING> is an alert that there is some inconsistency in the input data, but the

Air Resources Board TDM Evaluation Program 1.2

General Employer Information

Employer   Sample Employer

Address   100 Sample Lane
                  Los Angeles, CA 90001

Site Identifier   123456

Plan Sequence   1

SIC Code   1234

Plan Reviewer   wga

Comments   sample data with 1.21 Base AVR

File Date   5 Jul 1993

Average Vehicle Ratio Planning Form

	- B A S E -	- P L A N -	P E R C E N T - C H A N G E -
Total Employee Trips	1,020	1,020	0.0
Adjusted Commuting Vehicles	841	675	-19.7
Calculated AVR	1.21	1.51	24.6
Target AVR	1.50	1.50	
Allowable Vehicles/Week	680	680	
Necessary Vehicle Reduction	161	0	
Daily Vehicle Reduction	32	0	-100.0

(Note: it is not suggested that this is necessarily a typical, reasonable, appropriate, or cost-effective ETR program. This is intended only as an exercise to demonstrate the use of the program's various features.)

The sample report for this run is shown on the following five pages.

Air Resources Board TDM Evaluation Program 1.2

Cost Incentives

Change in Employee Commuting Cost ($)
(Includes both additional costs and subsidies)

Travel Mode	Change in Subsidy or Penalty per MONTH	Days Implemented After Plan Approval	Change in Parking Cost per DAY per Vehicle	Days Implemented After Plan Approval
Drive Alone	$ 0.00	1	$ 0.50	180
Motorcycle	$ 0.00	1	$ 0.00	1
2 Person Carpool	$ 0.00	1	$ 0.00	1
3 Person Carpool	$ 0.00	1	$ 0.00	1
4+Person Carpool	$ 0.00	1	$ 0.00	1
Vanpool	$ 0.00	1	$ 0.00	1
Transit	($ 10.00)	1		
Walk	($ 5.00)	1		
Bicycle	($ 5.00)	1		

Numbers in parentheses are cost savings or subsidies.
4-Person Carpool changes also apply to 5- and 6-Person Carpools.

Awareness of Existing Incentives

Element	Existing %	Projected %
Transit Info Center PLUS Bus Pass Sales	28	36
Use of Company Vehicles by Ridesharers	48	55
Bike Racks OR Showers/Lockers	52	53
Guaranteed Ride Home	38	44
Preferential Parking for Ridesharers	61	66
Transp. Coordinator PLUS Rideshare Matching	84	90
Company-Provided Vanpools	13	19
Prizes, Free Meals, Certificates	62	73

Air Resources Board TDM Evaluation Program 1.2

Site Information

	- B A S E -	- P L A N -	P E R C E N T - C H A N G E -
Total Employees	300	300	0.0
Employees Reporting 6-10 AM	300	300	0.0
Total Parking Spaces	290	290	0.0
ETR Program Marketing Cost/Year	3,000	6,000	100.0
ETR Program Admin. Cost/Year	5,000	6,000	20.0
No. of Retail Services Nearby	1	2	100.0

Base and Plan Employee/Vehicle Calculation

Travel Mode	- - - B A S E - - -		- - - P L A N - - -	
	Employees	Vehicles	Employees	Vehicles
Drive Alone	765	765	656	656
Motorcycle	0	0	0	0
2 Person Carpool	125	62	146	73
3 Person Carpool	30	9	36	12
4 Person Carpool	5	1	6	1
5 Person Carpool	0	0	0	0
6 Person Carpool	0	0	0	0
Vanpool	40	4	72	8
Transit	20		37	
Walk	10		11	
Bicycle	5		6	
Telecommute	10		40	
No Survey Response	0	0	0	0
3/36 Work Week	0		0	
4/40 Work Week	10		10	
9/80 Work Week	0		0	
Totals	1,020	841	1,020	750
Vacation	180		180	
Sick	200		200	
Other	80		80	

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Air Resources Board TDM Evaluation Program 1.2

Other Elements

Element	User-Estimated Effectiveness (1 - 10)	Number of Employees Eligible	Days Implemented After Plan Approval	Modes Affected
new vanpool incentive	5	300	1	VP

_____

Clean Fuels Credit Worksheet

	- - - B A S E - - -		- - - P L A N - - -	
Clean Fuel Vehicles	Column 1	Column 2	Column 1	Column 2
LPG Vehicles	0	0	0	0
Methanol Vehicles	0	0	0	0
CNG Vehicles	0	0	20	15
Electric Vehicles	0	0	0	0
Total Clean Fuel Vehicles/Day	0		15	
Total Clean Fuel Vehicles/5 Days	0		75	

Existing Support Elements

Element	Is Incentive Offered Now?
Transit Info Center PLUS Bus Pass Sales	n
Use of Company Vehicles by Ridesharers	y
Bike Racks OR Showers/Lockers	n
Guaranteed Ride Home	n
Preferential Parking for Ridesharers	n
Transp. Coordinator PLUS Rideshare Matching	n
Company-Provided Vanpools	n
Prizes, Free Meals, Certificates	y

Proposed Support Elements

Element	BASE	Number of Employees Eligible PLAN	Days Implemented After Plan Approval
Telecommuting	5	20	1
Alternative Work Schedule: 3/36	0	0	1
Alternative Work Schedule: 4/40	10	10	1
Alternative Work Schedule: 9/80	0	0	1
Transit Info Center PLUS Bus Pass Sales		300	1
Use of Company Vehicles by Ridesharers		0	1
Bike Racks OR Showers/Lockers		0	1
Guaranteed Ride Home		0	1
Preferential Parking for Ridesharers		150	1
Transp. Coordinator PLUS Rideshare Matching		0	1
Company-Provided Vanpools		300	1
Prizes, Free Meals, Certificates		0	1

The sample input data file (SAMPLE.R15) is shown below.

```
"Sample Employer",123456,1,"5 Jul 1993","wga",1.5,1234
"100 Sample Lane","Los Angeles, CA 90001","
"sample data with 1.21 Base AVR","
300,300,290,3000,5000,1,300,300,290,6000,6000,2
765,0,125,30,5,0,0,40,20,10,5
10,0,0,10,0,180,200,80,4
0,0,0,0,0,0,-10,-5,-5
1,1,1,1,1,1,1,1,1
.5,0,0,0,0,0
180,1,1,1,1,1
0,1,0,0,0,0,0,1
20,0,10,0,300,0,0,0,150,0,300,0
5,0,10,0
1,1,1,1,1,1,1,1,1,1,1,1
0,0,0,0,0,0,20,0
"new vanpool incentive",5,300,1,"VP"
```

Introduction Screen 1 (of 2)

Welcome to the Air Resources Board TDM Evaluation Program 1.2

This interactive program allows you to test a wide range of travel demand
management policies for a particular employment site. The program offers
a set of screens, where you describe the actions you wish to evaluate.

First, you enter some information about the employer and the Base number of
weekly employees for each commuting option. Next, you identify the
employer's current Travel Demand Management (TDM) incentives. Then, you
describe the NEW incentives that the employer proposes to implement in the
future. These incentives must be described in some detail in order for the
program to provide an accurate estimate of their likely effects. After all
this information is entered, press the F2 key to calculate the estimated
new Average Vehicle Ratio (AVR) and display the results on the screen.

You will use certain 'hot keys' to move around the program and perform
certain functions. At any point, press F10 to see the list of hot keys.
Press PgDn to Continue
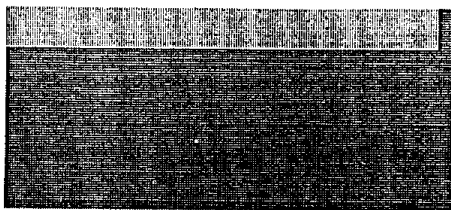
F2=Calc PgUp=Prev PgDn=Next F10=HotKeys

Air Resources Board

Travel Demand Management

Evaluation Program

Press Any Key to Continue

PLEASE REFER TO THE "CONDITIONS OF USE" PAGE OF THE USER'S GUIDE PRIOR
TO USING THIS SOFTWARE

General Employer Information

Employer
Address

Date   03 August 1993

Reviewer

Comments

Site Identifier   0

Plan Sequence   1

AVR Target   1.5

SIC Code   1

F1=Help F2=Calc PgUp=Prev PgDn=Next F10=HotKeys

Help 1

Enter some general information describing this employer/site.
Employer: employer/site name, up to 25 characters
Address: up to 4 lines of 25 characters each
Date: today's date is automatically inserted (you may enter another date)
    (If you Load a Plan's data, the date that plan was saved is inserted.)
Reviewer: your name or initials (max. 17 characters)
Comments: up to 50 characters of general identification
Site Identifier: the 6-digit code for this employer's site ID (max.: 999999)
Plan Sequence: the current plan sequence number (range: 1 - 99)
AVR Target: the AVR target value for this employer (range: 1.0 - 2.0)
SIC Code: this employer's 4-digit Standard Industrial Classification code

Press Any Key to Continue

Introduction Screen 2 (of 2)

Here is a list of the program's main input screens:
1   Introduction Screen 1   # 7   Enter Existing Incentives
2   Introduction Screen 2   # 8   Enter Proposed Incentives & Alt. Hrs.
3   Enter Gen. Employer Info. # 9   Enter Other Incentives
4   Enter Site Characteristics #10   Enter Clean Fuel Vehicle Data
5   Enter Employees by Mode
6   Enter Cost Incentives

The usual sequence of steps in using this program is as follows:
  A) Enter data describing employer and site characteristics.
  B) Enter data for the Base number of employees by commuting option.
  C) Enter data describing the Base and Plan incentives and other programs.
  D) Enter data describing the use of clean fuel vehicles (if any).
  E) Press F4 and provide a file name to save the data on disk.
  F) Press F2 to calculate the base and estimated new AVR.
  G) Perhaps repeat Step C to test additional incentives (F4 to save).
  H) Press F5 to create a report of the estimated data and results.
                    Press PgDn to Continue

	F2=Calc PgUp=Prev PgDn=Next F10=HotKeys

Base Employee/Vehicle Calculation

	Employee Trips		Employee Trips
Drive Alone	0	3/36 Work Week	0
Motorcycle	0	4/40 Work Week	0
2 Person Carpool	0	9/80 Work Week	0
3 Person Carpool	0		
4 Person Carpool	0	Vacation	0
5 Person Carpool	0	Sick	0
6 Person Carpool	0	Other	0
Vanpool	0		
Transit	0	Weekly Van Trips 0	
Walk	0		
Bicycle	0		
Telecommute	0		
No Survey Response	0		

F1=Help F2=Calc PgUp=Prev PgDn=Next F10=HotKeys

Help 3

Enter the number of employees per week who use each of these commuting choices. For the Vanpool mode, also enter the number of vehicles involved. This is the same information shown on the SCAQMD Weekly Employee/Vehicle Calculation Form IV-3.
Keep in mind that the weekly commuting information must include the proper accounting for the employees who do not commute to the site every day.
Press Any Key to Continue

Site Information

	- B A S E -	- P L A N -
Total Employees	0	0
Employees Reporting 6-10 AM	0	0
Total Parking Spaces	0	0
Marketing Cost of ETR Pgm. ($/yr)	0	0
Administrative Cost of ETR Pgm. ($/yr)	0	0
No. of Retail Land Uses On-Site	0	0

F1=Help F2=Calc PgUp=Prev PgDn=Next F10=HotKeys

Help 2

Enter some more information about this employer and site.
"BASE" means the existing condition, "PLAN" means what the employer estimates
  will occur by the time of the next plan review.
Total Employees: the total employment at this site.
Employees Reporting 6-10 AM: number of employees who start work 6:00-10:00 AM
  (must be less than or equal to the Total Employment).
Total Parking Spaces: total number of employee spaces owned or leased by
  the employer, whether on-site or nearby off-site (must be 1 or more)
Marketing Cost of ETR Pgm.: Annual funds expended to market, promote, or
  advertise the Employee Trip Reduction program to employees.
Administrative Cost of ETR Pgm.: Annual funds expended to administer the ETR
  program (salaries, benefits, supplies, etc.).
No. of Retail Land Uses On-Site: "Retail land uses" include a bank, dry
  cleaner, convenience store, video store, department store, pharmacy,
  restaurant, or shopping center (count each of these as one "land use").

Press Any Key to Continue

Existing Support Elements

Incentive Element	Is Incentive Offered Now? (y/n)
Transit Info Center PLUS Bus Pass Sales	n
Use of Company Vehicles by Ridesharers	n
Bike Racks OR Showers/Lockers	n
Guaranteed Ride Home	n
Preferential Parking for Ridesharers	n
Transp. Coordinator PLUS Rideshare Matching	n
Company-Provided Vanpools	n
Prizes, Free Meals, Certificates	n

F1=Help F2=Calc PgUp=Prev PgDn=Next F10=HotKeys

Help 6

For each of the incentives shown, indicate if the employer
already provides that incentive by entering a y or Y in the column.
In general, "already provides" means that the incentive was in place during
the week the employees were surveyed and was applicable to all employees
(there is no "partial credit" in this screen). See the User's Guide for
more detailed descriptions of these incentives. Use your judgement to
determine whether or not an employer already provides each of these
incentives.

Press Any Key to Continue

Cost Incentives

Travel Mode	Change in Subsidy or Penalty per MONTH	Days Implemented After Plan Approval		Change in Parking Cost per DAY per Vehicle	Days Implemented After Plan Approval
Drive Alone	$ 0.00	1	DA $	0.00	1
Motorcycle	$ 0.00	1	MC $	0.00	1
2 Person Carpool	$ 0.00	1	2P $	0.00	1
3 Person Carpool	$ 0.00	1	3P $	0.00	1
4 Person Carpool	$ 0.00	1	4P $	0.00	1
Vanpool	$ 0.00	1	VP $	0.00	1
Transit	$ 0.00	1			
Walk	$ 0.00	1			
Bicycle	$ 0.00	1			

(Here, 4 Person Carpool includes 5- and 6-Person Carpools.)

F1=Help F2=Calc PgUp=Prev PgDn=Next F10=HotKeys

Help 4

Under "Modal Subsidy", enter the CHANGE in penalty or subsidy per person, per month, in dollars and cents. Penalties for using a particular mode are entered as a positive cost, while subsidies to use a mode are entered as a negative change in cost. Maximum input value is $300.00.

Under "Parking Cost", enter the CHANGE in the parking cost per vehicle, per day, in dollars and cents. Additional parking costs are entered as positive values, while parking subsidies are entered as negative values. Maximum input value is $10.00.

Taking away a subsidy is the same as adding that subsidy to the trip's cost.

Under "Days Implemented", enter the number of days after which each change will be implemented. This must range from 1 to the number of days until the next plan review is scheduled to occur.

Entries in the "4 Person Carpool" field apply to the 5-Person and 6-Person Carpool modes also.

Press Any Key to Continue

Other Elements

Element Description	User-Estimated Effect-iveness (1 – 10)	Number of Employees Eligible	Days Implemented After Plan Approval	Modes That Are Affected
▓▓▓▓▓	1 1 1 1 1	0 0 0 0 0	1 1 1 1 1	▓▓▓▓▓

F1=Help F2=Calc PgUp=Prev PgDn=Next F10=HotKeys

Help 8

You may enter up to 5 more incentive types, to cover programs that do not fit into any of the other categories. For each type, enter the following:
Element Name: a description of the incentive (max. 24 characters)
User-Estimated Effectiveness: On a scale of 1 to 10 (1 = least effective,
    10 = most effective), give your estimate of the likely effectiveness of
    this incentive (see the User's Guide for more guidance on this).
Number of Employees Eligible: As in the other screens, enter the number of
    total employees which will be eligible to benefit from this incentive.
    You may take an incentive away by entering a negative Number of Employees,
    representing the number of employees who will lose that incentive.
Days Implemented: As in the other screens, the number of days after which
    this change will be implemented.
Modes That Are Affected: List the abbreviated codes of the modes that should
    be affected by this incentive. Up to 4 codes are allowed, separated by
    commas, for example: 2p,tr,vp. Case and order are not important. Codes:
    DA = drive alone   4P = 4-6 person pool   WK = walk
    MC = motorcycle   VP = vanpool   BK = bicycle
    2P = 2-person pool   CP = ALL carpool modes (2P, 3P, and 4P)
    3P = 3-person poool TR = public transit

Proposed Support Elements

Incentive Element	Number of Employees Eligible	Days Impl. After Plan Approval
B A S E P L A N		
Telecommuting	0	0	1
Alternative Work Schedule: 3/36	0	0	1
Alternative Work Schedule: 4/40	0	0	1
Alternative Work Schedule: 9/80	0	0	1
Transit Info Center PLUS Bus Pass Sales	0	1
Use of Company Vehicles by Ridesharers	0	1
Bike Racks OR Showers/Lockers	0	1
Guaranteed Ride Home	0	1
Preferential Parking for Ridesharers	0	1
Transp. Coordinator PLUS Rideshare Matching	0	1
Company-Provided Vanpools	0	1
Prizes, Free Meals, Certificates	0	1

F1=Help F2=Calc PgUp=Prev PgDn=Next F10=HotKeys

Help 7

Enter the total number of employees at this site who are eligible to
receive each incentive. Note that this is the number of employees who are
ELIGIBLE TO USE each benefit, NOT the number who WILL USE each benefit.
In most cases, this will be all employees at the site.
The "Number of Employees" must not exceed the number of Plan total employees
entered on Screen 4 (although it may exceed the number of Base total
employees and may exceed the number of employees arriving 6-10 AM).
You may take an incentive away by entering a negative Number of Employees,
representing the number of employees who will lose that incentive.
Under "Days Implemented", enter the number of days after which each
change will be implemented. This must range from 1 to the number of days
until the next plan review is scheduled to occur.
For the first 4 items (Alternative Work Hours) you must also enter the Base
(i.e., existing) number of employees who are eligible for each AWH option,
if any such employees are shown on Screen 5.

Press Any Key to Continue

General Employer Information

Average Vehicle Ratio Planning Form

	- B A S E -	- P L A N -
Total Employee Trips	1020	1020
Adjusted Commuting Vehicles	841	675
Calculated AVR	1.21	1.51
Target AVR	1.50	1.50
Allowable Vehicles/Week	680	680
Necessary Vehicle Reduction	161	0
Daily Vehicle Reduction	32	0

Sample Employer

F1=Help F2=Calc PgUp=Prev PgDn=Next F10=HotKeys

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GLOSSARY OF TERMS USED IN THE TDM PROGRAM

Adjusted Commuting Vehicles (in the AVR Planning Form, or F2 screen of the TDM Program) refers to the number of vehicles per week used by the employees in commuting to work, taking into account appropriate credits for using clean fuel or low emission vehicles. This number is used in the calculation of AVR.

Administrative Cost of ETR Program is the total amount spent per year to administer the employee trip reduction program. This includes staff, benefits, office supplies, etc.

Allowable Vehicles/Week (in the AVR Planning Form, or F2 screen of the TDM Program) refers to the maximum number of adjusted commuting vehicles an employer can have to achieve the Target AVR. If the adjusted commuting vehicles is greater than this value, the calculated AVR will exceed the target.

Average Vehicle Ridership (AVR) is the ratio of the number of employees who report to work during a certain time window (such as 6:00 a.m. to 10:00 a.m.) during the week, to the number of vehicles used by these employees during the same time frame. AVR definitions may vary from place to place. For example, the South Coast Air Quality District (SCAQMD) defines AVR as follows: "AVR is calculated by dividing the number of employees who report to the worksite or another job-related activity center between 6:00 a.m. and 10:00 a.m. inclusive Monday through Friday by the number of vehicles used by these employees. The AVR calculation requires that a five consecutive weekday average be used. The averaging period cannot contain a holiday." Vehicle credits may be given for the use of clean fuel or low emission vehicles.

AVR Target refers to targets specified by regulatory agencies which the employers have to aim for in implementing their trip reduction plans.

Base refers to existing conditions, including all strategies and incentives that are already in place.

Change in Parking Cost in the (Cost Incentive screen of the TDM Program) is expressed in dollars and cents, per vehicle, per day. Additional parking costs are entered as positive numbers, while increase in parking subsidies are entered as negative numbers.

Change in Subsidy or Penalty (in the Cost Incentive screen of the TDM Program) is expressed in dollars and cents, per person, per month. Additional penalties for using a particular mode are entered as positive numbers, while increased subsidies to use a mode are entered as negative numbers.

Days Implemented After Plan Approval indicates when the incentive or penalty will go into effect. The default is 1, meaning that the incentive or penalty is presumed to take effect immediately after plan approval.

Employee Trips represent the number of employees reporting to work from 6:00 to 10:00 AM over a 5-day survey week. It involves an accounting of all employees who normally report to work 6-10 AM during the survey week, even if they did not actually travel to the work site that week.

Employees Reporting 6-10 AM refers to the number of employees who report to work between 6:00 a.m. and 10:00 a.m. during the survey week. This value cannot exceed the number of Total Employees.

Marketing Cost of ETR Program is the total amount spent per year to market the employee trip reduction program. This includes brochures, fairs, and other forms of advertising and promotion.

Necessary Vehicle Reduction (in the AVR Planning Form, or F2 screen of the TDM Program) is the difference between Adjusted Commuting Vehicles and Allowable Vehicles/Week. It indicates how many vehicle trips per week the employer must reduce to attain Target AVR. **Daily Vehicle Reduction** refers to the Necessary Vehicle Reduction expressed on a per day basis.

Number of Employees Eligible is defined as the number of employees (up to the limit of Total Employees) who will be allowed to use the incentive shown, not the number who will actually use the incentive. In most cases, this will be the number of Total Employees.

Number of Retail Land Uses Nearby refers to the number of individual retail land uses within 1/2 mile of the employer's site. This includes a bank, dry cleaner, video store, pharmacy, convenience store, grocery store, restaurant, or shopping center (a shopping center or mall must be counted as one land use). Note that two establishments of the same type (two restaurants, for example) count as one land use.

Plan refers to what the employer expects to implement or to occur by the time of the next plan review.

Total Employee Trips (in the AVR Planning Form, or F2 screen of the TDM Program) is the number of employees who report to work per week, including those who worked at home or telecommuted, but excluding employees who are on vacation or sick. This number is used in the calculation of AVR.

Total Employees refers to the total number of persons employed at the site, including part-time employees.

Total Parking Spaces include all spaces available to employees, whether owned or leased, on-site or off-site.

Travel Demand Management (TDM) refers to a broad range of measures aimed at reducing

traffic volumes, especially during peak hours, by encouraging travelers to shift from driving alone to using high occupancy vehicles (such as carpools, vanpools, transit), using non-motorized modes (bike, walk), or shifting travelers to less congested times of day (such as flex-time), or shifting the place where the worker reports (such as telecommuting or working at home or satellite center), or be eliminating the need to travel during certain days of the week (such as compressed work week and no-drive days). These measures are adopted and implemented by public entities and private sector groups to achieve goals such as reduced traffic congestion, improved traffic flow, improved air quality, reduced fuel/energy consumption, and others.

Weekly Van Trips refers to the number of vanpool vehicle trips used by those employees who vanpool to the site.

DEFINITION OF SUPPORT INCENTIVES

Transit Information Center PLUS Bus Pass Sales. The employer would provide a central location where employees could obtain transit routes, schedule, and fare information. In addition, the employer would sell transit passes at the work site (if the employer also discounts the passes, the discount is reflected as a modal subsidy). Obviously, this is only applicable if the work site is (or will shortly be) served by a transit route. This incentive affects the transit mode.

Use of Company Vehicles by Ridesharers. Employers which maintain a fleet of vehicles would make them available for use by ridesharers for midday errands, lunch trips, etc. This incentive affects all ridesharing modes (carpool and vanpool).

Bike Racks/Storage OR Showers and Lockers. The employer would provide either a) a place where employees could shower and change clothes after riding a bicycle or walking to work, or b) a convenient, covered place where employees who bicycle to work could store their bicycles during the day, or both. Enough spaces must be set aside to accommodate all bicyclists. This incentive affects the bike/walk mode.

Guaranteed Ride Home. The employer would provide a means of transporting employees home if they did not drive to work alone that day. They might need this service to return home for midday emergencies or if they are required to work late at night and miss their ride or the last bus. Usually, taxicabs or employer fleet vehicles are used for this purpose. This incentive affects all alternative modes.

Preferential Parking for Ridesharers. The employer would reserve parking spaces close to the building entrance for use exclusively by carpools and vanpools. This is particularly effective if such spaces are clearly marked as being reserved, and are under cover. Enough spaces must be set aside to accommodate all ridesharing vehicles. This incentive affects all ridesharing modes (carpool and vanpool).

Transportation Coordinator PLUS Rideshare Matching. One of the usual requirements of an

ETR program is for employers to designate an Employee Transportation Coordinator (ETC) whose job is to facilitate the use of alternative modes by employees. This project's research indicated that an ETC is most effective if the employer also provides a rideshare matching program. Partial credit is not available for this incentive - both elements must be provided. This incentive affects all ridesharing modes (carpool and vanpool).

Company-Provided Vanpools. The employer would provide vans to facilitate the formation of vanpools. This consists of purchasing or leasing the vehicles, and arranging for insurance and maintenance. Vanpool riders would pay a monthly fare that would cover these costs - by providing the vans, the employer is merely enhancing the convenience of vanpooling. (If the employer also subsidizes all or part of the fare, this would be reflected as a modal subsidy, as discussed above.) This incentive affects the vanpool mode.

Prizes, Free Meals, Certificates. The employer would offer prizes, free meals, or gift certificates on a regular basis to employees who rideshare or use transit. These are assumed to be items of nominal value - if valuable items are involved, it may be appropriate to establish the cash value of the item and enter it as a financial incentive. This incentive affects the ridesharing and transit modes.

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A Survey and Analysis of Employee Responses to Employer-Sponsored Trip Reduction Incentive Programs

Technical Appendix B
TDM Evaluation Program User's Guide

CALIFORNIA ENVIRONMENTAL PROTECTION AGENCY

AIR RESOURCES BOARD
Research Division

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13. ABSTRACT *(Maximum 200 Words)*

The Technical Appendix B is a user-guide for a travel demand management (TDM) computer software developed from employee data collected in the Los Angeles and Sacramento areas of California. The Appendix describes software installation on an IBM PC, defines input data, and presents sample computer printout of the results. The TDM software provides a method of estimating the likely effects of various employer-based TDM strategies on average vehicle ridership for an employer's site.

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A SURVEY AND ANALYSIS OF EMPLOYEE RESPONSES TO EMPLOYER-SPONSORED TRIP REDUCTION INCENTIVE PROGRAMS

Technical Appendix B
TDM Evaluation Program User's Guide

Contract No. A932-187

Prepared for:

California Air Resources Board
Research Division
2020 L Street
Sacramento, California 95814

Prepared by:

COMSIS Corporation
21311 Hawthorne Blvd., Suite 230
Torrance, California 90503

FEBRUARY 1994

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Appendix B   **TRAVEL DEMAND MANAGEMENT PROGRAM USER'S GUIDE**

Conditions of Use

1. The State of California makes no warranty of any kind, expressed or implied, with respect to the Travel Demand Management Program (Program), and specifically makes no warranty that the Program shall be merchantable or fit for any particular purpose; furthermore, any description of the Program shall not be deemed to create an expressed warranty, that the Program shall conform to the description. Moreover, the exhibition of any sample or model shall not create an express warranty that the whole program shall conform to the sample or model.

2. The Travel Demand Management Program may be used only as an aid in planning or as an evaluation tool since the Program was developed solely upon available data from the regions of California administered by the South Coast Air Quality Management District and the Sacramento Air Quality Management District. Consequently, any Travel Management Plan predicted by or generated from the Program are only estimates and WILL NEITHER ASSURE COMPLIANCE NOR BE DEEMED AS COMPLYING WITH ANY LOCAL, STATE OR FEDERAL TRANSPORT REGULATORY CONTROL. Furthermore, the results, estimates or predictions generated by the Program do not imply nor do they guarantee the extent of trip reductions suggested when incentives are offered to any or all groups of motorists.

3. The user of buyer of the Program agrees to indemnify, defend and hold harmless the State of California, its officers, agents and employees from and against any and all claims, liability, loss, damage or expense, including reasonable attorney's fees, arising from or by reason of the user's or the buyer's use, possession or acceptance of the program and payment therefore by the buyer.

4. Recipient assumes all risk and liability for any and all loss, damage, claims or expenses resulting from the use, purchase, or possession of the Program furnished in any manner whatsoever by the State of California.

B.1   Introduction

The Travel Demand Management (TDM) Program was developed to provide a way of estimating the likely effects of various employer-based TDM strategies on the average vehicle ridership (AVR) for an employer's site. It is intended that the program be used initially by public agencies who are charged with evaluating an employer's TDM plan, to determine if proposed incentives are likely to result in the employer meeting the applicable AVR target. Ultimately, the program could be used by employers themselves, as a way of evaluating their own employee trip reduction (ETR) strategies. By taking much of the guesswork out of estimating incentive impacts and helping employers quickly focus on incentives that work, the TDM Program should improve the effectiveness of TDM plans, as well as the efficiency with which they are prepared. This program was originally designed primarily to evaluate compliance with the Regulation XV trip

reduction requirements of the South Coast Air Quality Management District (SCAQMD), and hence adheres to the definitions, conventions, and procedures of that regulation.

At the heart of the TDM Program is a five-mode logit mode choice model. The modes are: Drive Alone, Carpool, Vanpool, Transit, and Walk/Bike. Within the limitations of the available data, the model attempts to explain why commuters choose one travel mode over another. This model was developed using an extensive survey of employees in Los Angeles and Sacramento, supplemented by information from SCAQMD's Regulation XV database. Although no model can ever account for *every* factor which influences the mode choice of *every* individual, the model inside the TDM Program has been calibrated using the most rigorous techniques available. For more information about the model itself, see Appendix A.

Although the TDM Program is a leap forward in the evaluation of TDM incentives and strategies, it is subject to certain limitations which the user should bear in mind. The program cannot estimate an initial AVR for an employer – it requires a starting set of commute options, generally from a survey of employees (here, *commute options* refers to all possible choices, including commuting to work via a particular mode of travel, working at home, using a compressed work week, taking vacation, reporing sick, etc.). The program does not analyze the relationship between the input mode shares and the existing TDM incentives – it only estimates how the input mode shares (and AVR) are likely to change if new incentives are provided, existing incentives are modified, or incentives are better marketed, generally as part of the employer's TDM plan. There are dozens of actions that might convince commuters to use alternative travel modes (here, *alternative modes* refers to any commuting choice other than driving alone) or alternative work hours, but not all of them are represented in this program. This is because either these actions were not in common use when this project's surveys were performed, or the actions were found to be relatively ineffective in influencing mode choice, based on an examination of the entire database.

The TDM Program was written for a very specific group of users: people who are familiar with ETR programs (the Regulation XV program in particular) and who need to analyze proposed ETR plans to determine if the incentives that an employer would provide are sufficient to enable that employer to meet the applicable AVR target. The program is not intended for use by the general public, most transportation planners, or administrative personnel who are not familiar with ETR programs.

B.2   Program Installation

The TDM Program is distributed on one 3.5" floppy diskette. The program can be run from this floppy disk, but should be copied to a hard disk for faster performance. It is recommended that you create a new directory on your hard disk, such as C:\TDM, and copy all files from the floppy to the new directory. Your hard disk must have 300 Kb free space. You must then either: 1) always run the TDM Program from within that directory, or 2) change your DOS PATH command (usually in the AUTOEXEC.BAT file) to point to the directory in which the program is installed.

The program runs only on IBM-compatible computers running the DOS operating system, with at least 560 Kb available RAM. The program will run under MS-DOS 5.0 and 6.0, and under Windows 3.1. EGA and VGA color monitors and Hercules black-and-white monitors are supported (a color monitor is highly recommended). Dot-matrix and laser printers are supported.

The following five files are required by the program:

ARBTDM.EXE   HELPSCR.DAT
REG15.PCX   HELPNDX.DAT
PARAM.DAT

A sixth file, SAMPLE.R15, provides input data for a sample run of the program (see Section B.10).

B.3   Program Use

The user runs the program by typing

ARBTDM   <cr>

at the DOS prompt (<cr> = **Return** key). If a color monitor is being used, a colorful opening screen is shown and after about 2 seconds, pressing any key presents the first of two introduction screens.

The user navigates through the TDM Program mainly by using the **PgUp** and **PgDn** keys to move back and forth among the two introduction screens and eight input screens. These screens were designed to correspond to the Regulation XV plan forms. The screens are described as follows:

1. Introduction Screen 1: generally explains program operation
2. Introduction Screen 2: lists the screens and explains a typical sequence of steps in using the program
3. General Employer Information: enter some identifying information about this employer
4. Site Information: enter some data that describes this site
5. Base Employee/Vehicle Calculation: enter the Base (starting case) number of employees by commute option
6. Cost Incentives: enter any new financial subsidies or penalties or changes in parking cost
7. Existing Incentive Elements: identify whether or not certain incentives are already being provided
8. Proposed Incentive Elements: enter any new alternative work hours policies or identify other new incentives to use alternative modes
9. Other Elements: enter information on other incentives not covered in the previous screens
10. Clean Fuels Credit Worksheet: enter current and future numbers of clean fuel vehicles used by this site's employees

At the bottom of each screen is a list of the most important "hot keys":

F1   Help: displays a window with further information on the current input screen

F2   Calc: calculates an employer's AVR and displays it in a window

PgUp Prev: moves to the previous screen

PgDn Next: moves to the next screen

F10   HotKeys: displays a window listing additional action and navigation keys

At almost any time during a session, pressing the F10 key displays a window listing all the program's hot keys:

Keys to Navigate Around the Program			
F1	Help for data entry	F10	Show this window
F2	Calculate Base and Plan AVR	Home	Jump to Screen 3
F3	Load Plan data	End	Jump to Screen 10
F4	Save Plan data	PgUp	Go to previous screen
F5	Create report	PgDn	Go to next screen
F6	Clear all data fields	Alt-q	Quit program
	Keys to Navigate Around the Data Input Screens		
Tab or ↓	(Move to) next field	Shift-Tab or ↑	(Move to) previous field
Ctrl-a	(Move) left 1 word	Ctrl-f	(Move) right 1 word
Backspace	Delete 1 (character) left	Del	Delete 1 (character) right
Ins	Toggle Insert mode		

The usual sequence of steps in running this program is as follows:

1. Enter or import the data describing the employer, the site, and the employees by commute option on Screens 3-5, and any existing incentives on Screen 7. Press F2 to determine the Base AVR.

2. Select one or more new or modified alternative mode incentives (or disincentives to driving alone) on Screens 6-9. If there is (or will be) a clean fuel vehicle program, identify it on Screen 10.

3. Press F2 to calculate the change in AVR estimated to result from the change in incentives.

4. Repeat steps 2 and 3 as necessary.

5. Press F5 to create a report of the results. Press F4 to save the data to a file. Press Alt-q to exit the program.

B.4   Input Data

B.4.1   Data Entry Screens

The input screens are explained in the order in which they are displayed by the program. However, the user is not required to follow this sequence; after entering the Base employee commute option data on Screen 5, the user may fill in the other screens in any order.

Screen 3: General Employer Information

Employer name and address are not required, but are very helpful for keeping track of the data. A maximum of 25 characters may be input for the employer's name and up to 4 lines of address information.

For new input, the date is entered automatically as today's date. If an existing file is imported, the date on which that file was created is inserted.

The Reviewer should enter his or her name or initials (max. 17 characters) and any Comments (max. 50 characters) that pertain to this run.

The Site Identifier and Plan Sequence number are not required, but are used to create a file name if the user desires to save the input data. Default values of 0 and 1, respectively are provided by the program. Any value from 0 to 999999 may be entered for the Site Identifier and any value from 1 to 99 may be entered for the Plan Sequence number.

An AVR Target value is required. The default is 1.5 and the value must be between 1.0 and 2.0.

The employer's SIC Code (Standard Industrial Classification) must be entered next. This is a four-digit number that identifies the type of employer this is.

Quotation marks ("" or '') must not be included in any of these fields.

Screen 4: Site Information

On this screen, "Base" refers to the existing condition and "Plan" refers to the condition that is projected to exist by the end of the next plan review period. *In every input field of this screen, if the Plan value is left blank (or entered as zero), the program will fill it in with the Base value.*

Total Employees refers to the total number of employees at this site.

Employees Reporting 6-10 AM refers to the number of employees who report to work from 6:00 to 10:00 AM during the survey week. This value cannot exceed the number of Total Employees.

Total Parking Spaces include all spaces available to employees, whether owned or leased, on-site or off-site. This value may not be less than 1.

Marketing Cost of ETR Pgm. is the total amount spent per year to market the employee trip reduction program. This includes brochures, fairs, and other forms of advertising and promotion.

Administrative Cost of ETR Pgm. is the total amount spent per year to administer the employee trip reduction program. This includes staff, benefits, office supplies, etc.

The maximum allowable increase for the sum of annual marketing and administrative cost per employee is $25.00 (in 1992 dollars). If the user enters values which cause this limit to be exceeded, the program displays a warning message and recalculates the Plan marketing and administrative costs proportionately until the limit is reached.

No. of Retail Land Uses Nearby refers to the number of individual retail land uses within 1/2 mile of the employer's site. This includes a bank, dry cleaner, video store, pharmacy, convenience store, grocery store, restaurant, or shopping center (a shopping center or mall must be counted as *one* land use). Note that two establishments of the same type (two restaurants, say) count as one land use. Neither the Base nor Plan value may exceed 10. The most important value here is the *difference* between the Base and Plan values, not the absolute number.

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Screen 5: Base Employee/Vehicle Calculation

These values represent the number of employees reporting to work from 6:00 to 10:00 AM over a 5-day survey week. Thus, the total number of Employee Trips input on this screen must equal 5 times the Base number of Employees Reporting 6-10 AM that was input on Screen 4. If it does not, a warning will be issued. (Note that in this context, *Employee Trips* means an accounting of all employees who normally report to work 6-10 AM during the survey week, even if they did not actually travel to the work site that week.) Weekly Van Trips refers to the number of vanpool vehicle trips used by those employees who vanpool to the site. If there are any Vanpool employee trips, there should be at least some vanpool vehicle trips (otherwise a warning window will always be displayed). If the ratio of Vanpooling employees to Vanpool vehicles is less than 4 or greater than 20, a warning window is displayed and Parameter 51 is used as the actual vanpool occupancy. For further information and definitions, refer to the *Instructions and Plan Form* for The Commuter Program Trip Reduction Plan of the South Coast Air Quality Management District (January 1993).

Screen 6: Cost Incentives

Here, the user enters proposed *changes* in the cost of commuting by the travel modes listed. Cost changes are entered from the perspective of the employee. **Penalties and additional costs to the commuter are entered as positive changes; subsidies and cost reductions to the commuter are entered as negative changes.** All costs are entered in dollars and cents.

Subsidy/penalty changes are entered on the left as a cost per **employee** per **month**; the maximum such change is $300.00. Parking cost changes are entered on the right as a cost per **vehicle** per **day**; the maximum such change is $10.00.

In both cases, the user may indicate when each mode's incentive or penalty will go into effect, entered as the Days Implemented After Plan Approval. The default is 1, meaning that the incentive or penalty is presumed to go into effect immediately after plan approval. The maximum value is the number of days until the next plan review, which is coded as Parameter 57 (see Section B.8). Users should be careful to accurately reflect the most likely date that the incentive will be put in place.

All costs are converted to 1992 year dollars by factoring them by the ratio of the November 1992 U.S. Consumer Price Index (Urban Consumers, All Items) to the future CPI. The November 1992 CPI was 142.1 and the future CPI is Parameter 64 (see Section B.8). The default value of Parameter 64 is also 142.1, but in the future, this value should be changed to reflect the CPI for the year in which the program is being applied. For example, if the CPI in 1996 is 160.0, then a $3.00 parking charge in 1996 is equivalent to $2.66 in 1992 dollars (= 3.00 * 142.1/160.0).

A separate incentive or penalty cannot be entered for 5- or 6-person carpools. All changes entered for 4-person carpools will be applied to 5- and 6-person carpools as well.

Screen 7: Existing Support Elements

The TDM model research identified eight "soft" alternative mode incentives (see Section B.7). On this screen, the user identifies whether or not each of these incentives was provided by this employer at the time of the survey. If an incentive was offered, enter a "y" (or "Y") on the line next to that incentive. (This screen does not allow for "partial" incentives. It is supposed to reflect incentives that were available to all employees, preferably for the 12 months prior to the survey.)

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Screen 8: Proposed Support Elements

There are two parts to this screen. In the top part, the user enters the Base and Plan number of employees who are eligible to participate in any of four Alternative Work Hours (AWH) programs. If any employees were listed in Screen 5 as having used an AWH option, it is presumed that some employees *must* be eligible for AWH, and the user must enter a non-zero number on Screen 7, corresponding to the AWH option shown on Screen 5. It is assumed that on average, Telecommuters telecommute 1.8 days/week and travel to the worksite 3.2 days/week. This can be adjusted by changing Parameter 52 (see Section B.8).

In the bottom part, the user identifies the *new* TDM strategies shown by entering a non-zero value for Number of Employees Eligible. It bears emphasis that Number of Employees Eligible is defined as the number of employees (up to the limit of Total Employees) who will be allowed to use the incentive shown, **not the number who will actually use the incentive**. In most cases, this will be the number of Total Employees. (An exception might be the case in which an incentive is offered to all employees in a particular department or on a particular floor of a building, but is not offered to all the employer's employees.) In order to take an incentive away, the user should enter a negative number of employees, representing the number of employees who will no longer be eligible for the incentive.

In the case where two actions are linked by the word "PLUS", *both* actions must be implemented in order to receive credit. No partial credit is given for implementing one or the other alone, *except* in the case where the employer already offers one of the actions and proposes to newly implement the other one as part of his Plan. In the case where two actions are linked by the word "OR", credit is given if *either* action is implemented (but no extra credit is given for implementing both actions).

Screen 8 is for new incentives only. It is not permitted to enter a "y" for an incentive on Screen 7 and also enter a non-zero Number of Employees Eligible for that same incentive on Screen 8.

As in Screen 6, the default implementation date is the day after plan approval, but other values may be entered.

Screen 9: Other Elements

Although the actions listed on Screens 6-8 are those that the model calibration indicated were effective in reducing vehicle trips, it is possible that other TDM incentives might be considered in the future that could turn out to be just as effective as those already recognized by the TDM Program. Screen 9 allows the user to enter up to 5 additional incentives, by providing the following data for each:

Element Description: text description of the incentive (max. 25 characters, no quotation marks).

User-Estimated Effectiveness: a value of 1 (low) to 10 (high), based on the user's estimate of the likely effectiveness of the incentive. A "1" is roughly equivalent to a ridesharing subsidy of $0.30 per month, while a "10" is roughly equivalent to a ridesharing subsidy of $3.00 per month. Table 1 below presents the relative effectiveness of some of the other TDM incentives included in the program. An average value for Plan awareness (i.e., the average calculated for the other soft incentives) is applied to all user-entered incentives.

Number of Employees Eligible: defined as in the other screens.

Days Implemented After Plan Approval: defined as in the other screens.

Modes That Are Affected: the user must identify which mode(s) will be affected as a result of each element. This is done by entering a string of up to 4 mode abbreviations, separated by commas. The mode abbreviations are as follows: DA=drive alone, MC=motorcycle, 2P=2-person carpool, 3P=3-person carpool, 4P=4-, 5-, and 6-person carpool, VP=vanpool, TR=transit, BK=bicycle, WK=walk, CP=all carpool modes. Upper or lower case may be used and the order in which the modes are entered is not important.

It is the user's responsibility to ensure consistency between the element description, its effectiveness, and the modes that will be affected.

Table B-1
Relative Effectiveness of TDM Program Incentives

Incentive Change	Approximate Relative Effectiveness (1-10)
1 retail land use on-site or nearby	10
preferential parking for ridesharers	8
transportation coordinator PLUS matching program	7
$4/month transit fare subsidy	6
prizes, free meals, certificates	5
$2/month parking tax for single-occupant autos	4
$1/month rideshare subsidy	3

Screen 10: Clean Fuels Credit Worksheet

Some ETR programs give extra AVR credit if employees commute to the site in vehicles powered by alternative energy sources. These include liquified petroleum gas (LPG, or propane), compressed natural gas (CNG), methanol (operating on at least 85% methanol fuel), and electric vehicles. Screen 10 provides for entering the Base and Plan number of commuter vehicles by energy source. In contrast to Screen 3, if Base values are entered but Plan values are not, the Plan values are left blank (zero), and a warning is issued. For further information and definitions, refer to the *Instructions and Plan Form* for The Commuter Program Trip Reduction Plan of the South Coast Air Quality Management District (January 1993). Note that after 1994, it is likely that credit for clean fuel vehicles will no longer be allowed when calculating AVR. The policy on this may vary by air quality district and users are urged to confirm that such credits are allowable before data are entered on this screen.

B.4.2   Importing Data

Generally, the user will enter the data on these screens by typing in values at the keyboard. However, the program also allows the user to "import" data from two different types of files, via the F3 key. These are referred to as *.R15* files and *.DBF* files. Pressing F3 brings up a window asking which type of file the user wants to load data from. (If the user has not saved the data currently entered, a window is displayed warning that the data about to be loaded will overwrite the data already entered, and asking the user to confirm that this is what is desired.)

.R15 Files

Once data has been entered into the screens, pressing F4 saves all of the input data to a small plain text file (see below), which always has the extension .R15. Data which has been saved to an .R15 file can be re-loaded into the program at any time. After pressing F3 and selecting the .R15 file type, the program presents the user with a list of available .R15 files in the current directory. The user may search other directories or disks for other .R15 files, if desired. Once the desired file is located, pressing Enter loads the data into the program.

.DBF Files

The South Coast Air Quality Management District maintains a series of databases containing information from Regulation XV ETR plans submitted by employers. Three of these files, presently named COMPANY.DBF, AVR.DBF, and CLEAN.DBF, contain much of the data for Screens 3-5, and the TDM Program can extract that data from those files. After pressing F3 and selecting the .DBF option, the program presents a window in which the user must enter the Site Identifier and Plan Sequence Number of the desired plan (this presumes that the user has previously identified the Site ID and Sequence No. for the desired plan).

The program usually takes a few seconds to search through the three databases and extract the necessary information. If the necessary record is missing or deleted in any of the three files, the program will so inform the user (since most employers do not have a clean fuel vehicle program, the software will usually issue a warning to that effect and advise the user that any clean fuel vehicle data will have to be entered manually).

B.5   Calculation Methodology

The TDM Program uses two techniques to estimate the likely effects of TDM strategies, a rather straightforward method for Alternative Work Hours usage and a more complex method for the true commuting travel modes. In addition, a third procedure is used to estimate the awareness of employees to TDM incentives.

B.5.1   Alternative Work Hours

There are four AWH options in common use in California: telecommuting, 3/36 work week (3 days, 12 hours/day), 4/40 work week, and 9/80 work week (1 day off every two weeks). Research has indicated that the use of AWH options may not be well-suited to choice-based modelling, because the employee's selection of an AWH option is so closely tied to the AWH policies of the employer. Thus, the TDM Program requires the user to quantify the employer's AWH policy by entering the Base and Plan number of employees who are now eligible and who will be eligible to participate in each of the four AWH options (Screen 7). These options are mutually exclusive. That is, the sum of the employees who are eligible for these options must not exceed the Total Employment. It is presumed that an employee will not generally be eligible for both Telecommuting and 4/40 Work Week, for example, and even if he is, the employee will likely choose one or the other.

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For each AWH option, the ratio of the Plan to the Base eligible employees is multiplied by the Base number of employees who actually chose an AWH option, as indicated on Screen 5:

$$\text{Plan AWH Users} = \text{Base AWH Users} * \frac{\text{eligible Plan AWH employees}}{\text{eligible Base AWH employees}}$$

This calculation is done first, before any mode shift adjustments are applied. Also, in performing this calculation, a fixed value is assumed for the number of days per week that the average telecommuter telecommutes. The default value is 1.8, based on research by others, but this is changeable by editing the PARAM.DAT file (Parameter 52) – see Section B.8.

If the employer did not have an AWH program, but plans to have one in the future, a different technique is used. Analysis of the Regulation XV database has provided default "participation rates" for the four AWH options:

- telecommuting   71%
- 3/36 work week   27%
- 4/40 work week   28%
- 9/80 work week   35%

For example, 35% of all employees who were offered a 9/80 work week actually chose that option.

If the number of AWH-eligible employees is zero in the Base but non-zero in the Plan, these percentages are multiplied by the number of eligible Plan employees to estimate the likely usage of each AWH option. These percentages are changeable by editing the PARAM.DAT file (Parameters 53-56) – see Section B.8.

B.5.2   Incentive Awareness

Research for this project and other TDM studies has identified that employer-provided alternative mode incentives are not effective unless employees are *aware* that such incentives exist. The biggest improvements in AVR are invariably associated with employers who not only offer reasonable TDM incentives, but who also advertise and promote them to their employees. Note that awareness of an incentive is not the same as using it: in this context, *awareness* means that employees know that the incentive exists. Whether or not an incentive is applicable to them and whether or not they actually take advantage of the incentive are separate matters. In the TDM Program, awareness refers to the percentage of employees who are aware that a particular incentive is being offeredto them. It is determined separately for each incentive, for Base and Plan conditions.

Accurately determining employees' awareness of particular TDM incentives is a difficult task, requiring an extensive, detailed survey that is beyond the scope of the normal employee travel mode survey. As a result, the TDM Program includes an "awareness sub-model" that produces an estimate of this employer's employee awareness of each incentive. This sub-model is based on the same data collected for the main mode choice model and estimates percentage awareness for each

of 8 incentives as a function mainly of the annual ETR marketing and administrative cost per employee. As noted above, this includes brochures, fairs, and other forms of advertising and promotion, as well as salaries, benefits, and other costs of program administration. Two other variables play a small role: employer's SIC Code and size (Total Employees).

The estimated awareness is used to adjust the sensitivity of the mode choice model to the presence of the 8 soft incentives (see Section B.7). This is done in two ways. First, the *change* in awareness from Base to Plan is used to give additional credit for any soft incentives that are already in place. In effect, this reflects a greater influence of existing incentives, if the employer increases his annual budget for marketing and/or administering his ETR program. Second, the estimated Plan awareness values are used to determine the sensitivity of employees to any new incentives that are proposed. This reflects the fact that without a substantial marketing effort, it is likely that many employees will remain unaware of new incentives, and thus their impact will not be significant. Thus, the marketing and administrative costs that are entered on Screen 4 produce an indirect, but important influence on mode share.

The awareness percentages are applied only to the 8 soft incentives. The available research suggests that the awareness of hard (financial) incentives is not as important an issue. For more information on the awareness sub-model, see the Model Development report.

B.5.3 Commuting Mode Shifts

After the AWH usage has been accounted for, the program next estimates any shifts among the 11 actual travel modes: Drive Alone, Motorcycle, 2-Person Carpool, 3-Person Carpool, 4-Person Carpool, 5-Person Carpool, 6-Person Carpool, Vanpool, Transit, Bicycle, and Walk. This shift is calculated by applying the logit mode choice model in *pivot point* fashion (also known as the *incremental logit* model). The most significant feature of this approach is that the complete characteristics of the employer, employee, and travel conditions need not be known. All that is necessary is to have a starting mode share (provided by the employee survey) and the **change** in travel disutility for the site that would result from implementing the ETR plan under consideration. The change in travel disutility is simply the product of the logit coefficient(s) and the change(s) in travel conditions. In this case, the travel conditions that are most easily influenced by the employer are cost and the presence of certain incentives.

A discussion of the theory of logit mode choice modelling is beyond the scope of this document, but the interested reader is referred to *Discrete Choice Analysis: Theory and Application to Travel Demand*, by M. Ben-Akiva and S. Lerman (1985). The logit model developed as part of this project is documented in the *Model Calibration Report*. From the basic logit equation, it can be shown that the new probability of choosing a travel mode is given by:

$$P'_i = \frac{P_i * e^{\Delta U_i}}{(e^{\Delta U_i} - 1) * P_i + 1}$$

where:

P'_i = new mode i share

P_i = original mode i share

ΔU_i = change in disutility of mode i = $C_1 * \Delta Cost + C_2 * \Delta Incentive_1 + C_3 * \Delta Incentive_2 * A_{2p} + \ldots$

C_1, C_2, etc. = calibrated coefficients

A_{1p}, A_{2p}, etc. = estimated Plan awareness percentages for the soft incentives

Δ = change in attribute (ΔIncentive means that an incentive is proposed to exist where it did not before)

The key attribute of the incremental logit model is that all of the current (Base) characteristics of the employer, the site, the employees, and the transportation system are represented by the starting (Base) mode share. The TDM Program combines the calibrated coefficients with the change in cost and incentives input by the user to pivot off of the starting mode shares using the above equation.

One of the deficiencies of the incremental logit model is that it cannot pivot off of a starting mode share of zero. To remedy this, the TDM Program checks to see if the user has identified specific modal incentives for a travel mode for which there were no users in the Base data. In this case, the program supplies a "seed" modal share – a small value that has been derived from the Regulation XV database. This share is used to provide a starting point from which the mode choice model can pivot to reflect changes in incentives. These "zero mode seeds" are changeable by editing the PARAM.DAT file (Seed Values 1-10) – see Section B.8. After using the seed value and the new incentive to calculate a new mode share, the seed value is subtracted from the new share, leaving a "residual" mode share that is more likely to be of an appropriate magnitude for the circumstances.

B.6.   Program Outputs

The primary program output is the **window** that is presented when F2 is pressed, showing the Base AVR for the input survey data and the Plan AVR that is estimated to result from the incentives that have been entered. If the estimated Plan AVR value exceeds the input target AVR value, the window is colored green. If not, the window is colored red. Pressing the Enter key removes the window.

The program also produces a **report**, which is generated by pressing the F5 key (this also recalculates the Plan AVR). The user is then presented with a window that provides the following options:
• The user may print the report, save it to a text file, or both.
• If the report is being saved to a text file, a file name is required. A default file name is presented, composed of the Employer ID, Plan Sequence No., and the extension .PRN. Any legal DOS file name, with path information, may be entered here.
• If the report is being sent directly to a printer, a printer setup string may be provided. This will generally not be necessary, but permits the user to use different print features that are unique to the user's printer. The program automatically sends an Esc(ape) code before sending this setup string.

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• The user may create a short version of the full report, which is the first two pages of the full report. This gives the basic employer information, Base and Plan AVR calculation, and the Plan estimated trips by mode.

A sample report is shown in Section B.10. If the report is to be sent directly to the printer, the screen will become partially blank for a few seconds while the data is being sent to the printer. Note that the date at the bottom of each report page is the date on which the report was created, while the "File Date" shown on page 1 of the report is the date on which the original input file was created.

The final output option is to save the input data in a small text **file**. Pressing F4 displays a window in which the user enters a name for this file. A default name is already offered, composed of the 6-character Employer ID (with leading zeroes) plus the 2-character Plan Seqence Number (also with leading zeroes). The user may enter any legal DOS file name. The file extension is always ".R15". If a file with the same name already exists in the current directory, it will be overwritten without warning. This file contains all of the data that has been entered on the input screens. A sample of this file is shown in Section B.10.

B.7.   Incentives

The effort to calibrate the logit mode choice model that is inside the TDM Program examined numerous incentives for commuters to use alternative modes. As a result of Regulation XV, Southern California employees probably have the widest range of such incentives available. The annual Regulation XV surveys by employers and the special surveys conducted for this project yielded information that starts to provide a better understanding of which incentives are more effective than others. Only those incentives which proved to be the most effective are used in the TDM Program.

Financial incentives and disincentives have consistently ranked as the most effective TDM actions. From an employer's perspective, financial incentives are generally imposed through two techniques: direct modal subsidy or penalty, and parking surcharges or rebates. The direct modal subsidy/penalty is simply a periodic payment to commuters who choose to use one of the alternative travel modes. Conversely, employers may opt to impose a periodic penalty (tax, fee, etc.) on commuters who drive alone. An employer might offer something other than money, but which has a easily recognizable cash value. If that item is provided on a recurring basis and its cash value can be readily determined, then it might be considered equivalent to cash. These incentives are entered on the left side of Screen 6.

Parking charges and rebates are slightly more effective than modal subsidies. This is usually implemented as an extra daily or monthly charge for vehicles with one occupant, perhaps coupled with rebates for vehicles with more than one occupant. These incentives are entered on the right side of Screen 6.

Research has indicated that there are some *soft* (i.e., non-financial supportive) measures that can influence commuters to change travel modes, especially when combined with financial

incentives. The TDM Program includes eight such incentives, shown on Screens 7 and 8 and defined below:

• *Transit Information Center PLUS Bus Pass Sales*
The employer would provide a central location where employees could obtain transit route, schedule, and fare information. In addition, the employer would sell transit passes at the work site (if the employer also discounts the passes, the discount is reflected in a modal subsidy on Screen 6). Obviously, this is only applicable if the work site is (or will shortly be) served by a transit route. This incentive affects the transit mode.

• *Use of Company Vehicles by Ridesharers*
Employers which maintain a fleet of vehicles would make them available for use by ridesharers for midday errands, lunch trips, etc. This incentive affects all ridesharing modes (carpool and vanpool).

• *Bike Racks/Storage OR Showers and Lockers*
The employer would provide *either*: a) a place where employees could shower and change clothes after riding a bicycle or walking to work, or b) a convenient, covered place where employees who bicycle to work could store their bicycles during the day. Enough spaces must be set aside to accommodate all bicyclists. This incentive affects the bike/walk mode.

• *Guaranteed Ride Home*
The employer would provide a means of transporting employees home if they did not drive to work that day. They might need this service to return home for midday emergencies or if they are required to work late at night and miss their ride or the last bus. Usually, taxicabs or employer fleet vehicles are used for this purpose. This incentive affects all alternative modes.

• *Preferential Parking for Ridesharers*
The employer would reserve parking spaces close to the building entrance for use exclusively by carpools and vanpools. This is particularly effective if such spaces are clearly marked as being reserved, and are under cover. Enough spaces must be set aside to accommodate all ridesharing vehicles. This incentive affects all ridesharing modes (carpool and vanpool).

• *Transportation Coordinator PLUS Rideshare Matching*
One of the usual requirements of an ETR program is for employers to designate an Employee Transportation Coordinator (ETC), whose job it is to facilitate the use of alternative modes by employees. This project's research has indicated that an ETC is most effective if the employer also provides a rideshare matching program. Partial credit is not available for this incentive – both elements must be provided. This incentive affects all ridesharing modes (carpool and vanpool).

• *Company-Provided Vanpools*
The employer would provide vans to facilitate the formation of vanpools. This consists of purchasing or leasing the vehicles, and arranging for insurance and maintenance. Vanpool riders would pay a monthly fare that would cover these costs – by providing the vans, the employer is merely enhancing the convenience of vanpooling. (If the employer also subsidizes all or part of the

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fare, this would be reflected as a modal subsidy, as discussed above.) This incentive affects the vanpool mode.

• *Prizes, Free Meals, Certificates*

The employer would offer prizes, free meals, or gift certificates on a regular basis to employees who rideshare or use transit. These are assumed to be items of nominal value – if valuable items are involved, it may be appropriate to establish the cash value of the item and enter it as a financial incentive. This incentive affects the ridesharing and transit modes.

In addition to the specific financial and supportive incentives listed above, the TDM Program is sensitive to some additional attributes of the work site that the research indicated have an influence on alternative mode usage:

◊ *Parking Spaces per Employee*

If an employer provides fewer parking spaces, generally, fewer employees will drive to work. Although this did not turn out to be a sensitive variable in the model calibration, the program will estimate slightly increased transit use if spaces/employee are reduced.

◊ *Number of Retail Land Uses*

Employees often cite their need for a car to run midday errands as a reason for driving to work. This research indicated that the presence of retail land uses at the work site is associated with greater carpool and transit use. As noted above, these retail land uses include a bank, dry cleaner, video store, pharmacy, convenience store, grocery store, restaurant, or shopping center (a shopping center or mall count would each be counted as *one* land use).

B.8. Parameters

The TDM Program uses several *parameters*, which are numeric constants and file names that generally will not vary from run to run, but which the user may find necessary to modify over time. For that reason, they have not been "hard coded" in the program, but are input via the PARAM.DAT file. This is a plain text file that can be edited with any text editor or word processor (using plain text or ASCII format). The PARAM.DAT file is listed and annotated below.

B.8.1 Mode Choice Model Coefficient Section

The first group of parameters are the coefficients of the logit mode choice model within the TDM Program. **These coefficients were derived from a detailed model calibration effort and they should not be changed without a thorough understanding of the implications for the results. Any coefficient changes must be documented.**

```
Travel Demand Management Program Parameters   27 Jul 93

Mode Choice Model Coefficients
C   1   Financial Incentive              DA          -0.0125
C   2   Financial Incentive              RS          -0.0125
```

B-15

```
C    3   Financial Incentive                         TR          -0.00609
C    4   Financial Incentive                         BW          -0.0125
C    5   Parking Cost                                DA, RS      -0.00855
C    6   Parking Spaces/Total Employee               TR          -0.4155
C   10   No. of On-Site Retail Land Uses             CP           0.1069
C   11   No. of On-Site Retail Land Uses             TR           0.1069
C   12   Preferential Parking for Ridesharers        RS           0.1214
C   13   Company-Provided Vanpools                   VP           2.5860
C   14   Use of Company Vehicles by Ridesharers      RS           0.7861
C   15   Transp. Coord. PLUS Rideshare Matching      RS           0.0777
C   20   Guaranteed Ride Home                        RS,TR,BW     0.4476
C   21   Transit Info Center PLUS Bus Pass Sales     TR           1.0830
C   23   Bike Racks/Storage OR Showers/Lockers       BW           0.4056
C   25   Prizes, Free Meals, Certificates            RS, TR       0.0826
```

B.8.3   Awareness Sub-Model Coefficient Section

This group of parameters are the coefficients of the awareness sub-model within the TDM Program. **These coefficients were derived from a detailed model calibration effort and they should not be changed without a thorough understanding of the implications for the results. Any coefficient changes must be documented.**

```
Awareness Sub-Model Coefficients
A    1   Transit Info/Pass Sales: constant                         0.1056
A    2   Transit Info/Pass Sales: slope                            0.0064
A    3   Bike Racks OR Showers: constant                           0.5035
A    4   Bike Racks OR Showers: slope                              0.0007
A    5   Guaranteed Ride Home: SIC Code cutoff                  4800
A    6   Guaranteed Ride Home: employment cutoff                 300
A    7   Guaranteed Ride Home: logit bound                         0.78
A    8   Guaranteed Ride Home: logit constant                      0.7880
A    9   Guaranteed Ride Home: logit coefficient                  -0.0267
A   10   Guaranteed Ride Home: linear constant                     0.0
A   11   Guaranteed Ride Home: linear slope                        0.0011
A   12   Preferential Parking for Ridesharers: bound               0.82
A   13   Preferential Parking for Ridesharers: constant           -0.3514
A   14   Preferential Parking for Ridesharers: coefficient        -0.0273
A   15   Transp. Coord. PLUS RS Matching: employment cutoff      200
A   16   Transp. Coord. PLUS RS Matching: logit bound              0.92
A   17   Transp. Coord. PLUS RS Matching: logit constant          0.7267
A   18   Transp. Coord. PLUS RS Matching: logit coefficient      -0.1149
A   19   Transp. Coord. PLUS RS Matching: linear constant         0.2663
A   20   Transp. Coord. PLUS RS Matching: linear slope            0.0015
A   21   Company-Provided Vanpools: constant                       0.0
A   22   Company-Provided Vanpools: slope                          0.0047
```

```
A  23  Prizes, Free Meals, Certificates: bound            0.80
A  24  Prizes, Free Meals, Certificates: constant          0.9
A  25  Prizes, Free Meals, Certificates: coefficient     -0.0800
```

B.8.4   File Section

This section contains the file names of the SCAQMD Regulation XV database files from which information can be extracted. If these files are located elsewhere, then these entries must be edited to indicate their location (drive and directory).

```
File Names
F   1   name of DBF containing employer data            company.dbf
F   2   name of DBF containing AVR data                 avr.dbf
F   3   name of DBF containing clean fuel vehicle data  clean.dbf
```

B.8.5   Miscellaneous Parameter Section

Most of this section contains the field numbers of those items in the Regulation XV database that are used in the TDM Program. For example, COMPANY_ID is currently the name of the second field in the COMPANY.DBF database file. It does not matter if the *name* of this field changes, but if its *position* in the file changes, then that must be reflected here. If the structure of the Regulation XV database changes, then these parameter values must be re-checked and edited if necessary. Parameters 46 - 57 are other values used by the program.

```
Miscellaneous Parameters
P   1   COMPANY DBF field no. containing COMPANY_ID       2
P   2   COMPANY DBF field no. containing PLAN_SEQ         3
P   3   COMPANY DBF field no. containing CO_NAME          6
P   4   COMPANY DBF field no. containing SI_ST_NO        12
P   5   COMPANY DBF field no. containing SI_ST_PREF      13
P   6   COMPANY DBF field no. containing SI_ST_NAME      14
P   7   COMPANY DBF field no. containing SI_ST_TYPE      15
P   8   COMPANY DBF field no. containing SI_ST_UNIT      16
P   9   COMPANY DBF field no. containing SI_LOC          17
P  10   COMPANY DBF field no. containing SI_CITY         18
P  11   COMPANY DBF field no. containing SI_STATE        19
P  12   COMPANY DBF field no. containing SI_ZIP          20
P  13   COMPANY DBF field no. containing SRA             24
P  14   COMPANY DBF field no. containing TOT_SITE        27
P  15   COMPANY DBF field no. containing TOT_6_10        28
P  16   AVR DBF field no. containing COMPANY_ID           1
P  17   AVR DBF field no. containing PLAN_SEQ             2
P  18   AVR DBF field no. containing CAR1                 6
P  19   AVR DBF field no. containing MOTORCYCLE           7
```

```
P  20  AVR DBF field no. containing CAR2                          8
P  21  AVR DBF field no. containing CAR3                          9
P  22  AVR DBF field no. containing CAR4                         10
P  23  AVR DBF field no. containing CAR5                   (not used)
P  24  AVR DBF field no. containing CAR6                   (not used)
P  25  AVR DBF field no. containing VAN                         11
P  26  AVR DBF field no. containing VAN_COUNT                   12
P  27  AVR DBF field no. containing TRANSIT                     15
P  28  AVR DBF field no. containing WALK                        16
P  29  AVR DBF field no. containing BIKE                        17
P  30  AVR DBF field no. containing TELE                        18
P  32  AVR DBF field no. containing NON                         20
P  33  AVR DBF field no. containing COM_3_36                    21
P  34  AVR DBF field no. containing COM_4_40                    22
P  35  AVR DBF field no. containing COM_9_80                    23
P  36  AVR DBF field no. containing VAC                         25
P  37  AVR DBF field no. containing SICK                        26
P  38  AVR DBF field no. containing OTHERS                      27
P  39  AVR DBF field no. containing AVR_TAR                     32
P  40  CLEAN DBF field no. containing COMPANY_ID                 1
P  41  CLEAN DBF field no. containing PLAN_SEQ                   2
P  42  CLEAN DBF field no. containing LPG                        8
P  43  CLEAN DBF field no. containing METHANOL                   9
P  44  CLEAN DBF field no. containing CNG                       10
P  45  CLEAN DBF field no. containing ELECTRIC                  11
P  46  LPG clean fuel credit factor                           0.50
P  47  Methanol clean fuel credit factor                      0.67
P  48  CNG clean fuel credit factor                           0.75
P  49  Electric vehicle clean fuel credit factor              0.80
P  50  CGA snow suppression (0=yes, <0=def.=don't suppress)     -2
P  51  Default average vanpool occupancy                       8.8
P  52  Average days/week that Telecommuters telecommute        1.0
P  53  Default Telecommuting participation rate               0.71
P  54  Default 3/36 Schedule participation rate               0.27
P  55  Default 4/40 Schedule participation rate               0.28
P  56  Default 9/80 Schedule participation rate               0.35
P  57  Days before next plan submittal                         365
P  58  COMPANY DBF field no. containing OWN_ONSITE             132
P  59  COMPANY DBF field no. containing LES_ONSITE             133
P  60  COMPANY DBF field no. containing OWNOFFSITE             134
P  61  COMPANY DBF field no. containing LESOFFSITE             135
P  62  COMPANY DBF field no. containing OTHOFFSITE             136
P  63  COMPANY DBF field no. containing SIC                     23
P  64  U.S. Consumer Price Index (Urban), Future             142.1
```

B.8.6   Seed Value Section

This section contains the "seed" values to be used if the travel mode shown has a starting (survey) share of 0.0%, but the user wishes to reflect an increase in that share as the result of a specific incentive for that mode. These values were derived from experience with the first three years of Regulation XV plan data. They are expressed as a proportion, so for example, the seed share for 3-person carpools is 2.5% of total actual commute trips.

```
Zero Mode Seed Values
S    1   3-person pool                                    0.025
S    2   4-person pool                                    0.008
S    3   vanpool: < 400 employees                         0.001
S    4   vanpool: 400+ employees                          0.016
S    5   public transit: Downtown (1.75 AVR area)         0.160
S    6   public transit: all other areas                  0.029
S    7   walk: < 400 employees                            0.015
S    8   walk: 400+ employees                             0.010
S    9   bike: Downtown (1.75 AVR area)                   0.002
S   10   bike: all other areas                            0.009
```

Extra "comment" lines may be placed in the PARAM.DAT file for documentation purposes, as long as the first column of such lines is blank. This file has a fixed-column format, as follows:

columns	item
1 - 1	parameter section indicator (C, F, P, or S)
2 - 5	parameter number
6 - 60	parameter description
61 - 71	parameter value

B.9   Miscellaneous

B.9.1   Help Windows

The TDM Program provides on-line help for each screen or window where user input is required. Pressing F1 displays the help window and pressing any key removes it. The help window information is stored in two binary files: HELPSCR.DAT and HELPNDX.DAT, which must be in the same directory as the program.

B.9.2   Error/Warning Windows

The program performs extensive checking for improper input values and other conditions which would lead to illogical results (for example, any combination of circumstances that would result in an AVR exceeding 9.99). Three types of notification are given to the user. A yellow window labelled <WARNING> is an alert that there is some inconsistency in the input data, but the

program will try to continue anyway. If the user ignores this window, the accuracy and logic of the results cannot be assured. A red window labelled <ERROR> indicates a more serious problem with the input data or program operation. The program will not permit the user to proceed further until the problem is corrected. In either of those cases, pressing the Enter key removes the window.

A red window showing <Go Ahead> and <Cancel> at the bottom indicates that the user is about to take some action which could cause data loss or other unintended consequences. Selecting <Go Ahead> allows the action to continue, while <Cancel> aborts the action.

B.9.3   Quitting the Program

The user quits the program by pressing Alt-q (the **Alt** key and the **q** key simultaneously). The program asks for confirmation, whereupon if the user presses the **y** or **Y** key (no Enter key needed), the program ends.

B.10   Sample Run

A sample input file has been prepared (SAMPLE.R15) to help the user become familiar with the TDM Program. This file is for a hypothetical employer with a surveyed starting AVR of 1.21 and 300 employees. A sample of the full report for this case is listed below, showing the input data, proposed incentives, and estimated AVR results.

This employer *currently* provides these incentives: Use of Company Vehicles by Ridesharers and Prizes, Free Meals, Certificates. This run of the program tests the following actions that the employer proposes for the coming year:
- *Increase* in annual ETR marketing cost from $3,000 to $6,000.
- *Increase* in annual ETR administrative cost from $5,000 to $6,000.
- Construction of a *new* restaurant on-site.
- *New* subsidy of bus passes in the amount of $10.00 per month.
- *New* subsidy of $5.00 per month for commuters who bike or walk to work.
- *Increase* in the parking cost for single-occupant vehicles from $0.25 per day to $0.75 per day, to be implemented 6 months later.
- *Increase* in the number of employees eligible for Telecommuting from 5 to 20.
- *New* transit information office, which distributes route, fare, and schedule information and sells bus passes.
- *Expansion* of current preferential parking spaces for rideshare vehicles to cover the remaining half of the parking lot so that all ridesharers will have access to the reserved spaces (only half of the lot is so covered today).
- *New* program of providing vans for the use of vanpoolers.
- *New* program of general start-up assistance for vanpools, estimated to have a relative effectiveness of 5.
- Vehicle fleet to acquire 20 *new* compressed natural gas vehicles, to be used by commuters for testing purposes.

(Note: it is not suggested that this is necessarily a typical, reasonable, appropriate, or cost-effective ETR program. This is intended only as an exercise to demonstrate the use of the program's various features.)

The sample report for this run is shown on the following five pages.

Air Resources Board TDM Evaluation Program 1.2

General Employer Information

Employer   Sample Employer

Address   100 Sample Lane
                    Los Angeles, CA 90001

Site Identifier   123456

Plan Sequence   1

SIC Code   1234

Plan Reviewer   wga

Comments   sample data with 1.21 Base AVR

File Date   5 Jul 1993

Average Vehicle Ratio Planning Form

	- B A S E -	- P L A N -	P E R C E N T - C H A N G E -
Total Employee Trips	1,020	1,020	0.0
Adjusted Commuting Vehicles	841	675	-19.7
Calculated AVR	1.21	1.51	24.6
Target AVR	1.50	1.50	
Allowable Vehicles/Week	680	680	
Necessary Vehicle Reduction	161	0	
Daily Vehicle Reduction	32	0	-100.0

Air Resources Board TDM Evaluation Program 1.2

Site Information

	- B A S E -	- P L A N -	P E R C E N T - C H A N G E -
Total Employees	300	300	0.0
Employees Reporting 6-10 AM	300	300	0.0
Total Parking Spaces	290	290	0.0
ETR Program Marketing Cost/Year	3,000	6,000	100.0
ETR Program Admin. Cost/Year	5,000	6,000	20.0
No. of Retail Services Nearby	1	2	100.0

Base and Plan Employee/Vehicle Calculation

Travel Mode	- - - B A S E - - - Employees	Vehicles	- - - P L A N - - - Employees	Vehicles
Drive Alone	765	765	656	656
Motorcycle	0	0	0	0
2 Person Carpool	125	62	146	73
3 Person Carpool	30	9	36	12
4 Person Carpool	5	1	6	1
5 Person Carpool	0	0	0	0
6 Person Carpool	0	0	0	0
Vanpool	40	4	72	8
Transit	20		37	
Walk	10		11	
Bicycle	5		6	
Telecommute	10		40	
No Survey Response	0	0	0	0
3/36 Work Week	0		0	
4/40 Work Week	10		10	
9/80 Work Week	0		0	
Totals	1,020	841	1,020	750
Vacation	180		180	
Sick	200		200	
Other	80		80	

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Air Resources Board TDM Evaluation Program 1.2

Cost Incentives

Change in Employee Commuting Cost ($)
(Includes both additional costs and subsidies)

Travel Mode	Change in Subsidy or Penalty per MONTH	Days Implemented After Plan Approval	Change in Parking Cost per DAY per Vehicle	Days Implemented After Plan Approval
Drive Alone	$ 0.00	1	$ 0.50	180
Motorcycle	$ 0.00	1	$ 0.00	1
2 Person Carpool	$ 0.00	1	$ 0.00	1
3 Person Carpool	$ 0.00	1	$ 0.00	1
4+Person Carpool	$ 0.00	1	$ 0.00	1
Vanpool	$ 0.00	1	$ 0.00	1
Transit	($ 10.00)	1		
Walk	($ 5.00)	1		
Bicycle	($ 5.00)	1		

Numbers in parentheses are cost savings or subsidies.
4-Person Carpool changes also apply to 5- and 6-Person Carpools.

Awareness of Existing Incentives

Element	Existing %	Projected %
Transit Info Center PLUS Bus Pass Sales	28	36
Use of Company Vehicles by Ridesharers	48	55
Bike Racks OR Showers/Lockers	52	53
Guaranteed Ride Home	38	44
Preferential Parking for Ridesharers	61	66
Transp. Coordinator PLUS Rideshare Matching	84	90
Company-Provided Vanpools	13	19
Prizes, Free Meals, Certificates	62	73

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Existing Support Elements

Element	Is Incentive Offered Now?
Transit Info Center PLUS Bus Pass Sales	n
Use of Company Vehicles by Ridesharers	y
Bike Racks OR Showers/Lockers	n
Guaranteed Ride Home	n
Preferential Parking for Ridesharers	n
Transp. Coordinator PLUS Rideshare Matching	n
Company-Provided Vanpools	n
Prizes, Free Meals, Certificates	y

Proposed Support Elements

Element	BASE	Number of Employees Eligible PLAN	Days Implemented After Plan Approval
Telecommuting	5	20	1
Alternative Work Schedule: 3/36	0	0	1
Alternative Work Schedule: 4/40	10	10	1
Alternative Work Schedule: 9/80	0	0	1
Transit Info Center PLUS Bus Pass Sales		300	1
Use of Company Vehicles by Ridesharers		0	1
Bike Racks OR Showers/Lockers		0	1
Guaranteed Ride Home		0	1
Preferential Parking for Ridesharers		150	1
Transp. Coordinator PLUS Rideshare Matching		0	1
Company-Provided Vanpools		300	1
Prizes, Free Meals, Certificates		0	1

Other Elements

Element	User-Estimated Effective-ness (1 - 10)	Number of Employees Eligible	Days Implemented After Plan Approval	Modes Affected
new vanpool incentive	5	300	1	VP

Clean Fuels Credit Worksheet

	- - - B A S E - - -		- - - P L A N - - -	
Clean Fuel Vehicles	Column 1	Column 2	Column 1	Column 2
LPG Vehicles	0	0	0	0
Methanol Vehicles	0	0	0	0
CNG Vehicles	0	0	20	15
Electric Vehicles	0	0	0	0
Total Clean Fuel Vehicles/Day	0		15	
Total Clean Fuel Vehicles/5 Days	0		75	

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The sample input data file (SAMPLE.R15) is shown below.

```
"Sample Employer",123456,1,"5 Jul 1993","wga",1.5,1234
"100 Sample Lane","Los Angeles, CA 90001","
"sample data with 1.21 Base AVR","
300,300,290,3000,5000,1,300,300,290,6000,6000,2
765,0,125,30,5,0,0,40,20,10,5
10,0,0,10,0,180,200,80,4
0,0,0,0,0,0,-10,-5,-5
1,1,1,1,1,1,1,1,1
.5,0,0,0,0,0
180,1,1,1,1,1
0,1,0,0,0,0,0,1
20,0,10,0,300,0,0,0,150,0,300,0
5,0,10,0
1,1,1,1,1,1,1,1,1,1,1,1
0,0,0,0,0,0,20,0
"new vanpool incentive",5,300,1,"VP"
```

Air Resources Board

Travel Demand Management

Evaluation Program

(Press Any Key to Continue)

PLEASE REFER TO THE "CONDITIONS OF USE" PAGE OF THE USER'S GUIDE PRIOR
TO USING THIS SOFTWARE

Introduction Screen 1 (of 2)

Welcome to the Air Resources Board TDM Evaluation Program 1.2

This interactive program allows you to test a wide range of travel demand management policies for a particular employment site. The program offers a set of screens, where you describe the actions you wish to evaluate.

First, you enter some information about the employer and the Base number of weekly employees for each commuting option. Next, you identify the employer's current Travel Demand Management (TDM) incentives. Then, you describe the NEW incentives that the employer proposes to implement in the future. These incentives must be described in some detail in order for the program to provide an accurate estimate of their likely effects. After all this information is entered, press the F2 key to calculate the estimated new Average Vehicle Ratio (AVR) and display the results on the screen.

You will use certain 'hot keys' to move around the program and perform certain functions. At any point, press F10 to see the list of hot keys.
Press PgDn to Continue

F2=Calc PgUp=Prev PgDn=Next F10=HotKeys

Introduction Screen 2 (of 2)

Here is a list of the program's main input screens:
1 Introduction Screen 1   # 7 Enter Existing Incentives
2 Introduction Screen 2   # 8 Enter Proposed Incentives & Alt. Hrs.
3 Enter Gen. Employer Info.   # 9 Enter Other Incentives
4 Enter Site Characteristics #10 Enter Clean Fuel Vehicle Data
5 Enter Employees by Mode
6 Enter Cost Incentives

The usual sequence of steps in using this program is as follows:
  A) Enter data describing employer and site characteristics.
  B) Enter data for the Base number of employees by commuting option.
  C) Enter data describing the Base and Plan incentives and other programs.
  D) Enter data describing the use of clean fuel vehicles (if any).
  E) Press F4 and provide a file name to save the data on disk.
  F) Press F2 to calculate the base and estimated new AVR.
  G) Perhaps repeat Step C to test additional incentives (F4 to save).
  H) Press F5 to create a report of the estimated data and results.
                    Press PgDn to Continue

F2=Calc PgUp=Prev PgDn=Next F10=HotKeys

General Employer Information

Employer
Address ▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓

Site Identifier ▓0▓

Plan Sequence ▓1▓

AVR Target ▓1.5▓

Date ▓03 August 1993▓

SIC Code ▓1▓

Reviewer ▓▓▓▓▓▓▓▓▓

Comments ▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓▓

F1=Help F2=Calc PgUp=Prev PgDn=Next F10=HotKeys

Help 1

Enter some general information describing this employer/site.
Employer: employer/site name, up to 25 characters
Address: up to 4 lines of 25 characters each
Date: today's date is automatically inserted (you may enter another date)
    (If you Load a Plan's data, the date that plan was saved is inserted.)
Reviewer: your name or initials (max. 17 characters)
Comments: up to 50 characters of general identification
Site Identifier: the 6-digit code for this employer's site ID (max.: 999999)
Plan Sequence: the current plan sequence number (range: 1 - 99)
AVR Target: the AVR target value for this employer (range: 1.0 - 2.0)
SIC Code: this employer's 4-digit Standard Industrial Classification code

Press Any Key to Continue

Site Information

	- B A S E -	- P L A N -
Total Employees	0	0
Employees Reporting 6-10 AM	0	0
Total Parking Spaces	0	0
Marketing Cost of ETR Pgm. ($/yr)	0	0
Administrative Cost of ETR Pgm. ($/yr)	0	0
No. of Retail Land Uses On-Site	0	0

F1=Help F2=Calc PgUp=Prev PgDn=Next F10=HotKeys

Help 2

Enter some more information about this employer and site.
"BASE" means the existing condition, "PLAN" means what the employer estimates
will occur by the time of the next plan review.
Total Employees: the total employment at this site.
Employees Reporting 6-10 AM: number of employees who start work 6:00-10:00 AM
(must be less than or equal to the Total Employment).
Total Parking Spaces: total number of employee spaces owned or leased by
the employer, whether on-site or nearby off-site (must be 1 or more)
Marketing Cost of ETR Pgm.: Annual funds expended to market, promote, or
advertise the Employee Trip Reduction program to employees.
Administrative Cost of ETR Pgm.: Annual funds expended to administer the ETR
program (salaries, benefits, supplies, etc.).
No. of Retail Land Uses On-Site: "Retail land uses" include a bank, dry
cleaner, convenience store, video store, department store, pharmacy,
restaurant, or shopping center (count each of these as one "land use").

Press Any Key to Continue

Base Employee/Vehicle Calculation

Employee
Trips

Employee
Trips

Drive Alone   0

Motorcycle   0

2 Person Carpool   0

3 Person Carpool   0

4 Person Carpool   0

5 Person Carpool   0

6 Person Carpool   0

Vanpool   0

Transit   0

Walk   0

Bicycle   0

Telecommute   0

No Survey Response   0

3/36 Work Week   0

4/40 Work Week   0

9/80 Work Week   0

Vacation   0

Sick   0

Other   0

Weekly Van
Trips   0

F1=Help F2=Calc PgUp=Prev PgDn=Next F10=HotKeys

Help 3

Enter the number of employees **per week** who use each of these commuting choices. For the Vanpool mode, also enter the number of vehicles involved. This is the same information shown on the SCAQMD Weekly Employee/Vehicle Calculation Form IV-3.
Keep in mind that the weekly commuting information must include the proper accounting for the employees who do not commute to the site every day.

Press Any Key to Continue

Cost Incentives

Travel Mode	Change in Subsidy or Penalty per MONTH	Days Implemented After Plan Approval		Change in Parking Cost per DAY per Vehicle	Days Implemented After Plan Approval
Drive Alone	$ 0.00	1	DA $	0.00	1
Motorcycle	$ 0.00	1	MC $	0.00	1
2 Person Carpool	$ 0.00	1	2P $	0.00	1
3 Person Carpool	$ 0.00	1	3P $	0.00	1
4 Person Carpool	$ 0.00	1	4P $	0.00	1
Vanpool	$ 0.00	1	VP $	0.00	1
Transit	$ 0.00	1			
Walk	$ 0.00	1			
Bicycle	$ 0.00	1			

(Here, 4 Person Carpool includes 5- and 6-Person Carpools.)

F1=Help F2=Calc PgUp=Prev PgDn=Next F10=HotKeys

Help 4

Under "Modal Subsidy", enter the CHANGE in penalty or subsidy per person, per month, in dollars and cents. Penalties for using a particular mode are entered as a positive cost, while subsidies to use a mode are entered as a negative change in cost. Maximum input value is $300.00.
Under "Parking Cost", enter the CHANGE in the parking cost per vehicle, per day, in dollars and cents. Additional parking costs are entered as positive values, while parking subsidies are entered as negative values. Maximum input value is $10.00.
Taking away a subsidy is the same as adding that subsidy to the trip's cost.
Under "Days Implemented", enter the number of days after which each change will be implemented. This must range from 1 to the number of days until the next plan review is scheduled to occur.
Entries in the "4 Person Carpool" field apply to the 5-Person and 6-Person Carpool modes also.

Press Any Key to Continue

Existing Support Elements

Incentive Element	Is Incentive Offered Now? (y/n)
Transit Info Center PLUS Bus Pass Sales	n
Use of Company Vehicles by Ridesharers	n
Bike Racks OR Showers/Lockers	n
Guaranteed Ride Home	n
Preferential Parking for Ridesharers	n
Transp. Coordinator PLUS Rideshare Matching	n
Company-Provided Vanpools	n
Prizes, Free Meals, Certificates	n

F1=Help F2=Calc PgUp=Prev PgDn=Next F10=HotKeys

Help 6

For each of the incentives shown, indicate if the employer
already provides that incentive by entering a y or Y in the column.
In general, "already provides" means that the incentive was in place during
the week the employees were surveyed and was applicable to all employees
(there is no "partial credit" in this screen). See the User's Guide for
more detailed descriptions of these incentives. Use your judgement to
determine whether or not an employer already provides each of these
incentives.

Press Any Key to Continue

Proposed Support Elements

Incentive Element		Number of Employees Eligible	Days Impl. After Plan Approval
	B A S E	P L A N	
Telecommuting	0	0	1
Alternative Work Schedule: 3/36	0	0	1
Alternative Work Schedule: 4/40	0	0	1
Alternative Work Schedule: 9/80	0	0	1
Transit Info Center PLUS Bus Pass Sales		0	1
Use of Company Vehicles by Ridesharers		0	1
Bike Racks OR Showers/Lockers		0	1
Guaranteed Ride Home		0	1
Preferential Parking for Ridesharers		0	1
Transp. Coordinator PLUS Rideshare Matching		0	1
Company-Provided Vanpools		0	1
Prizes, Free Meals, Certificates		0	1

F1=Help F2=Calc PgUp=Prev PgDn=Next F10=HotKeys

Help 7

Enter the total number of employees at this site who are eligible to
receive each incentive. Note that this is the number of employees who are
ELIGIBLE TO USE each benefit, NOT the number who WILL USE each benefit.
In most cases, this will be all employees at the site.
The "Number of Employees" must not exceed the number of Plan total employees
entered on Screen 4 (although it may exceed the number of Base total
employees and may exceed the number of employees arriving 6-10 AM).
You may take an incentive away by entering a negative Number of Employees,
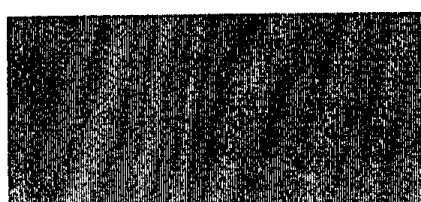representing the number of employees who will lose that incentive.
Under "Days Implemented", enter the number of days after which each
change will be implemented. This must range from 1 to the number of days
until the next plan review is scheduled to occur.
For the first 4 items (Alternative Work Hours) you must also enter the Base
(i.e., existing) number of employees who are eligible for each AWH option,
if any such employees are shown on Screen 5.
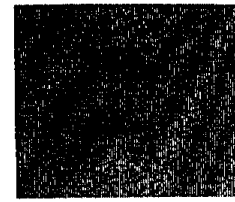
Press Any Key to Continue

Other Elements

Element Description	User-Estimated Effectiveness (1 - 10)	Number of Employees Eligible	Days Implemented After Plan Approval	Modes That Are Affected
	1 1 1 1 1	0 0 0 0 0	1 1 1 1 1	

F1=Help F2=Calc PgUp=Prev PgDn=Next F10=HotKeys

Help 8

You may enter up to 5 more incentive types, to cover programs that do not
fit into any of the other categories. For each type, enter the following:
Element Name: a description of the incentive (max. 24 characters)
User-Estimated Effectiveness: On a scale of 1 to 10 (1 = least effective,
    10 = most effective), give your estimate of the likely effectiveness of
    this incentive (see the User's Guide for more guidance on this).
Number of Employees Eligible: As in the other screens, enter the number of
    total employees which will be eligible to benefit from this incentive.
    You may take an incentive away by entering a negative Number of Employees,
    representing the number of employees who will lose that incentive.
Days Implemented: As in the other screens, the number of days after which
    this change will be implemented.
Modes That Are Affected: List the abbreviated codes of the modes that should
    be affected by this incentive. Up to 4 codes are allowed, separated by
    commas, for example: 2p,tr,vp. Case and order are not important. Codes:
    DA = drive alone   4P = 4-6 person pool   WK = walk
    MC = motorcycle   VP = vanpool   BK = bicycle
    2P = 2-person pool   CP = ALL carpool modes (2P, 3P, and 4P)
    3P = 3-person poool TR = public transit

Clean Fuels Credit Worksheet

	- B A S E -	- P L A N -
LPG Vehicles	0	0
Methanol Vehicles	0	0
CNG Vehicles	0	0
Electric Vehicles	0	0

===== W A R N I N G ! ! ! =====

After 1994, the inclusion of clean fuel vehicles is likely to be no longer allowed. Before entering data on this screen you are advised to confirm that taking credit for the inclusion of clean fuel vehicles is allowed for your air quality district, for the time frame of your analysis.

F1=Help F2=Calc PgUp=Prev PgDn=Next F10=HotKeys

Help 9

Enter the number of clean fuel vehicles per day in each fuel category.
Enter the current number of such vehicles in the Base column and the projected number of such vehicles in the Plan column.

Press Any Key to Continue

General Employer Information

Average Vehicle Ratio Planning Form

	- B A S E -	- P L A N -
Total Employee Trips	1020	1020
Adjusted Commuting Vehicles	841	675
Calculated AVR	1.21	1.51
Target AVR	1.50	1.50
Allowable Vehicles/Week	680	680
Necessary Vehicle Reduction	161	0
Daily Vehicle Reduction	32	0

Sample Employer	F1=Help F2=Calc PgUp=Prev PgDn=Next F10=HotKeys

GLOSSARY OF TERMS USED IN THE TDM PROGRAM

Adjusted Commuting Vehicles (in the AVR Planning Form, or F2 screen of the TDM Program) refers to the number of vehicles per week used by the employees in commuting to work, taking into account appropriate credits for using clean fuel or low emission vehicles. This number is used in the calculation of AVR.

Administrative Cost of ETR Program is the total amount spent per year to administer the employee trip reduction program. This includes staff, benefits, office supplies, etc.

Allowable Vehicles/Week (in the AVR Planning Form, or F2 screen of the TDM Program) refers to the maximum number of adjusted commuting vehicles an employer can have to achieve the Target AVR. If the adjusted commuting vehicles is greater than this value, the calculated AVR will exceed the target.

Average Vehicle Ridership (AVR) is the ratio of the number of employees who report to work during a certain time window (such as 6:00 a.m. to 10:00 a.m.) during the week, to the number of vehicles used by these employees during the same time frame. AVR definitions may vary from place to place. For example, the South Coast Air Quality District (SCAQMD) defines AVR as follows: "AVR is calculated by dividing the number of employees who report to the worksite or another job-related activity center between 6:00 a.m. and 10:00 a.m. inclusive Monday through Friday by the number of vehicles used by these employees. The AVR calculation requires that a five consecutive weekday average be used. The averaging period cannot contain a holiday." Vehicle credits may be given for the use of clean fuel or low emission vehicles.

AVR Target refers to targets specified by regulatory agencies which the employers have to aim for in implementing their trip reduction plans.

Base refers to existing conditions, including all strategies and incentives that are already in place.

Change in Parking Cost in the (Cost Incentive screen of the TDM Program) is expressed in dollars and cents, per vehicle, per day. Additional parking costs are entered as positive numbers, while increase in parking subsidies are entered as negative numbers.

Change in Subsidy or Penalty (in the Cost Incentive screen of the TDM Program) is expressed in dollars and cents, per person, per month. Additional penalties for using a particular mode are entered as positive numbers, while increased subsidies to use a mode are entered as negative numbers.

Days Implemented After Plan Approval indicates when the incentive or penalty will go into effect. The default is 1, meaning that the incentive or penalty is presumed to take effect immediately after plan approval.

Employee Trips represent the number of employees reporting to work from 6:00 to 10:00 AM over a 5-day survey week. It involves an accounting of all employees who normally report to work 6-10 AM during the survey week, even if they did not actually travel to the work site that week.

Employees Reporting 6-10 AM refers to the number of employees who report to work between 6:00 a.m. and 10:00 a.m. during the survey week. This value cannot exceed the number of Total Employees.

Marketing Cost of ETR Program is the total amount spent per year to market the employee trip reduction program. This includes brochures, fairs, and other forms of advertising and promotion.

Necessary Vehicle Reduction (in the AVR Planning Form, or F2 screen of the TDM Program) is the difference between Adjusted Commuting Vehicles and Allowable Vehicles/Week. It indicates how many vehicle trips per week the employer must reduce to attain Target AVR. **Daily Vehicle Reduction** refers to the Necessary Vehicle Reduction expressed on a per day basis.

Number of Employees Eligible is defined as the number of employees (up to the limit of Total Employees) who will be allowed to use the incentive shown, not the number who will actually use the incentive. In most cases, this will be the number of Total Employees.

Number of Retail Land Uses Nearby refers to the number of individual retail land uses within 1/2 mile of the employer's site. This includes a bank, dry cleaner, video store, pharmacy, convenience store, grocery store, restaurant, or shopping center (a shopping center or mall must be counted as one land use). Note that two establishments of the same type (two restaurants, for example) count as one land use.

Plan refers to what the employer expects to implement or to occur by the time of the next plan review.

Total Employee Trips (in the AVR Planning Form, or F2 screen of the TDM Program) is the number of employees who report to work per week, including those who worked at home or telecommuted, but excluding employees who are on vacation or sick. This number is used in the calculation of AVR.

Total Employees refers to the total number of persons employed at the site, including part-time employees.

Total Parking Spaces include all spaces available to employees, whether owned or leased, on-site or off-site.

Travel Demand Management (TDM) refers to a broad range of measures aimed at reducing

traffic volumes, especially during peak hours, by encouraging travelers to shift from driving alone to using high occupancy vehicles (such as carpools, vanpools, transit), using non-motorized modes (bike, walk), or shifting travelers to less congested times of day (such as flex-time), or shifting the place where the worker reports (such as telecommuting or working at home or satellite center), or be eliminating the need to travel during certain days of the week (such as compressed work week and no-drive days). These measures are adopted and implemented by public entities and private sector groups to achieve goals such as reduced traffic congestion, improved traffic flow, improved air quality, reduced fuel/energy consumption, and others.

Weekly Van Trips refers to the number of vanpool vehicle trips used by those employees who vanpool to the site.

DEFINITION OF SUPPORT INCENTIVES

Transit Information Center PLUS Bus Pass Sales. The employer would provide a central location where employees could obtain transit routes, schedule, and fare information. In addition, the employer would sell transit passes at the work site (if the employer also discounts the passes, the discount is reflected as a modal subsidy). Obviously, this is only applicable if the work site is (or will shortly be) served by a transit route. This incentive affects the transit mode.

Use of Company Vehicles by Ridesharers. Employers which maintain a fleet of vehicles would make them available for use by ridesharers for midday errands, lunch trips, etc. This incentive affects all ridesharing modes (carpool and vanpool).

Bike Racks/Storage OR Showers and Lockers. The employer would provide either a) a place where employees could shower and change clothes after riding a bicycle or walking to work, or b) a convenient, covered place where employees who bicycle to work could store their bicycles during the day, or both. Enough spaces must be set aside to accommodate all bicyclists. This incentive affects the bike/walk mode.

Guaranteed Ride Home. The employer would provide a means of transporting employees home if they did not drive to work alone that day. They might need this service to return home for midday emergencies or if they are required to work late at night and miss their ride or the last bus. Usually, taxicabs or employer fleet vehicles are used for this purpose. This incentive affects all alternative modes.

Preferential Parking for Ridesharers. The employer would reserve parking spaces close to the building entrance for use exclusively by carpools and vanpools. This is particularly effective if such spaces are clearly marked as being reserved, and are under cover. Enough spaces must be set aside to accommodate all ridesharing vehicles. This incentive affects all ridesharing modes (carpool and vanpool).

Transportation Coordinator PLUS Rideshare Matching. One of the usual requirements of an

ETR program is for employers to designate an Employee Transportation Coordinator (ETC) whose job is to facilitate the use of alternative modes by employees. This project's research indicated that an ETC is most effective if the employer also provides a rideshare matching program. Partial credit is not available for this incentive - both elements must be provided. This incentive affects all ridesharing modes (carpool and vanpool).

Company-Provided Vanpools. The employer would provide vans to facilitate the formation of vanpools. This consists of purchasing or leasing the vehicles, and arranging for insurance and maintenance. Vanpool riders would pay a monthly fare that would cover these costs - by providing the vans, the employer is merely enhancing the convenience of vanpooling. (If the employer also subsidizes all or part of the fare, this would be reflected as a modal subsidy, as discussed above.) This incentive affects the vanpool mode.

Prizes, Free Meals, Certificates. The employer would offer prizes, free meals, or gift certificates on a regular basis to employees who rideshare or use transit. These are assumed to be items of nominal value - if valuable items are involved, it may be appropriate to establish the cash value of the item and enter it as a financial incentive. This incentive affects the ridesharing and transit modes.

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