# TDM2MOVES

## A TRAVEL DEMAND MODEL APPLICATION TO GENERATE TRAVEL ACTIVITY INPUT DATA FOR THE MOVES MODEL

Kip Billings, P.E.
Andy Li, Phd
Wasatch Front Regional Council
October 14, 2010

# Overview

I. WFRC travel model characteristics
II. TDM2MOVES - description
III. TDM2MOVES - data inputs
IV. TDM2MOVES - methodology
V. Emission calculations: *look-up tables*
VI. Other MOVES adaptations
    a. Daily VMT inputs
    b. New road type for Local Roads

# I. WFRC Travel Model Characteristics

- Population
  - 2010 **2.2M**
  - 2040 **3.5M**
- Four counties
  - distinct I/M programs
- Six non-attainment areas (+2 for $O_3$)
- Two pollution seasons
- Four time periods *(AM, midday, PM, evening)*
- TDM zones – 3,400
- TDM links – 21,000

# II. TDM2MOVES - description

- Travel demand model application (CUBE)
- Post process following traffic assignment
- Creates CSV input for MOVES (42 files)
  - Speed profile
  - VMT by vehicle type
  - Ramp percentage
  - Road type distribution
- Creates travel activity summary (24 files)
- Run time:  47 sec

# III. TDM2MOVES - data inputs

- HPMS factors
  - Adjust model results to HPMS
    - For the base year: ***HPMSf = HPMSvmt / MODELvmt***
  - By county and facility
- AADT factors
  - By county, facility, and season
- VMT mix (vehicle type activity percentage)
  - By county, facility, and year

# AADT & HPMS Factors
## Look-up Table

| A | HPMSF | aadtF_SM | aadtF_WT | HPMSR | aadtR_SM | aadtR_WT | HPMSL | aadtL_SM | aadtL_WT | HPMSA | aadtA_SM | aadtA_WT |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0.983 | 1.042 | 0.955 | 0.983 | 1.042 | 0.955 | 2.966 | 1.016 | 0.972 | 1.120 | 1.016 | 0.972 |
| 2 | 1.043 | 1.042 | 0.955 | 1.043 | 1.042 | 0.955 | 2.886 | 1.016 | 0.972 | 1.051 | 1.016 | 0.972 |
| 3 | 0.928 | 1.010 | 0.989 | 0.928 | 1.010 | 0.989 | 2.769 | 1.018 | 0.972 | 0.979 | 1.018 | 0.972 |
| 4 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 |
| 5 | 1.013 | 1.042 | 0.955 | 1.013 | 1.042 | 0.955 | 3.978 | 1.016 | 0.972 | 0.957 | 1.016 | 0.972 |
| 6 | 0.867 | 1.010 | 0.989 | 0.867 | 1.010 | 0.989 | 3.132 | 1.018 | 0.972 | 0.901 | 1.018 | 0.972 |
| 7 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 |

*Note – Column "A" denotes county or city geographic area.*

# Sample Look-up Table for Arterial VMT Mix Factors

| A | YEAR | VEH_11 | VEH_21 | VEH_31 | VEH_32 | VEH_41 | VEH_42 | VEH_43 | VEH_51 | VEH_52 | VEH_53 | VEH_54 | VEH_61 | VEH_62 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 2010 | 0.00572 | 0.41117 | 0.34416 | 0.11799 | 0.00255 | 0.00079 | 0.00288 | 0.00110 | 0.03584 | 0.00484 | 0.00216 | 0.02950 | 0.04131 |
| 2 | 2010 | 0.00619 | 0.44451 | 0.34937 | 0.11978 | 0.00156 | 0.00049 | 0.00177 | 0.00077 | 0.02513 | 0.00339 | 0.00151 | 0.01897 | 0.02656 |
| 3 | 2010 | 0.00622 | 0.44709 | 0.36227 | 0.12420 | 0.00125 | 0.00039 | 0.00141 | 0.00061 | 0.01999 | 0.00270 | 0.00120 | 0.01361 | 0.01906 |
| 4 | 2010 | 0.00594 | 0.42691 | 0.34782 | 0.11924 | 0.00164 | 0.00051 | 0.00186 | 0.00087 | 0.02838 | 0.00383 | 0.00171 | 0.02553 | 0.03575 |
| 1 | 2020 | 0.00500 | 0.35940 | 0.38436 | 0.12731 | 0.00269 | 0.00075 | 0.00299 | 0.00107 | 0.03668 | 0.00540 | 0.00224 | 0.02921 | 0.04290 |
| 2 | 2020 | 0.00543 | 0.39029 | 0.39194 | 0.12982 | 0.00166 | 0.00047 | 0.00184 | 0.00075 | 0.02584 | 0.00380 | 0.00158 | 0.01887 | 0.02771 |
| 3 | 2020 | 0.00546 | 0.39214 | 0.40598 | 0.13447 | 0.00132 | 0.00037 | 0.00147 | 0.00060 | 0.02054 | 0.00302 | 0.00126 | 0.01352 | 0.01986 |
| 4 | 2020 | 0.00521 | 0.37392 | 0.38925 | 0.12893 | 0.00174 | 0.00049 | 0.00193 | 0.00085 | 0.02911 | 0.00429 | 0.00178 | 0.02533 | 0.03720 |
| 1 | 2030 | 0.00453 | 0.32509 | 0.41015 | 0.13044 | 0.00292 | 0.00079 | 0.00320 | 0.00114 | 0.03933 | 0.00585 | 0.00244 | 0.02998 | 0.04414 |
| 2 | 2030 | 0.00494 | 0.35456 | 0.42005 | 0.13359 | 0.00181 | 0.00049 | 0.00198 | 0.00080 | 0.02782 | 0.00414 | 0.00172 | 0.01945 | 0.02864 |
| 3 | 2030 | 0.00496 | 0.35625 | 0.43511 | 0.13838 | 0.00144 | 0.00039 | 0.00158 | 0.00064 | 0.02212 | 0.00329 | 0.00137 | 0.01394 | 0.02052 |
| 4 | 2030 | 0.00472 | 0.33896 | 0.41627 | 0.13239 | 0.00189 | 0.00051 | 0.00207 | 0.00090 | 0.03128 | 0.00466 | 0.00194 | 0.02605 | 0.03836 |

*Note – Column "A" denotes county geographic area.*

# IV. TDM2MOVES – methodology

- Link level calculations
- Aggregate & sort results
- Generate files
  - MOVES inputs
  - VMT summary

# IV. TDM2MOVES – methodology
*(continued)*

- Link level calculations
  - Speed profile
    - (determine speed bin and tally VHT)
  - VMT by vehicle type
  - Ramp percentage
  - Road type distribution

# Calculation: Speed Profile

**For the AM time period:**

$$PfwyVHT\_AMbin\_x = fwyVHT\_AMbin\_x / \{[SUM]fwyVHT\_AM\}$$

**and,**

$$PartVHT\_AMbin\_x = artVHT\_AMbin\_x / \{[SUM]artVHT\_AM\}$$

**and,**

$$PlocVHT\_AMbin\_x = locVHT\_AMbin\_x / \{[SUM]locVHT\_AM\}$$

**Repeat for midday (MD), PM peak (PM) & evening (EV)**

Where:

*PfwyVHT_AMbin_x*, *PartVHT_AMbin_x*, and *PlocVHT_AMbin_x* are the percentage of VHT in speed bin "x" for freeways, arterials, and local roads respectively,

*fwyVHT_AMbin_x* , *artVHT_AMbin_x* and *locVHT_AMbin_x* are the VHT on freeway, arterial and local road class links with operating speeds in the range of bin_x, and

*[SUM]*fwy*VHT _AM*, *[SUM]artVHT _AM*and *[SUM]locVHT _AM* are the totals respectively of all freeway, arterial and local road VHT for all speed ranges.

# Calculation:
## VMT by Vehicle Type

$$VMT\_wtVeh\_n = (rampVMT + fwyVMT) * mixF\_n * HPMSf * AADTf\_wt + artVMT * mixA\_n * HPMSa * AADTa\_wt + locVMT * mixL\_n * HPMSl * AADTl\_wt$$

Where:

*VMT_wtVeh_n* is the winter VMT for vehicle type "n" (MOVES types 10, 20, 30, 40, 50, 60),

*RampVMT, fwyVMT, artVMT, and locVMT* is the modeled VMT for freeways, ramps, arterials, and local roads respectively,

*mixF_n, mixA_n, and mixL_n* is the percentage of VMT on freeways/ramps, arterials, and local roads respectively for vehicle type "n" (MOVES types 10, 20, 30, 40, 50, 60),

*HPMSf, HPMSa, HPMSl* is the HPMS adjustment factor for freeways/ramps, arterials, and local roads respectively, and

*AADTf_wt, AADTa_wt, and AADTl_wt* is the winter AADT factor for freeways/ramps, arterials, and local roads respectively.

# Calculation: Ramp Percentage

***RampPCT = rampVHT / ( rampVHT + fwyVHT)***

Subject to EPA Review.

Where:

*RampPCT* is the ramp VHT as a percentage of total ramp and freeway VHT,

*rampVHT* is the VHT on ramps, and

*fwyVHT* is the VHT on freeways.

# Calculation: Road Distribution

***Veh_nPctFwy_wt =***
***(rampVMT + fwyVMT) * HPMSf * AADTf_wt * mixF_n / TotalVMT_wt{for veh_n}***

**And likewise for Arterials, Locals, and Total VMT…..**

Where:

*RampVMT, fwyVMT, artVMT, and locVMT* is the modeled VMT for freeways, ramps, arterials, and local roads respectively,

*mixF_n, mixA_n, and mixL_n* is the percentage of VMT on freeways/ramps, arterials, and local roads respectively for vehicle type "n" (MOVES types 10, 20, 30, 40, 50, 60),

*HPMSf, HPMSa, HPMSl* is the HPMS adjustment factor for freeways/ramps, arterials, and local roads respectively, and

*AADTf_wt, AADTa_wt, and AADTl_wt* is the winter AADT factor for freeways/ramps, arterials, and local roads respectively.

# IV. TDM2MOVES – methodology *(continued)*

- **Aggregate calculations**
  - **By time period**
  - **By speed bin**
  - **By facility type**
  - **By city *(non-attainment only)***
  - **By county**
  - **By season *(VMT & Road type)***
- **Print Resulting Files**
  - **“MV” prefix for MOVES inputs**
  - **Year, county, season, file type**
  - **CSV format**
  - **Summary files with “lookup” index**

# TDM2MOVES Files Created

- MV_VMTxVeh_SL2030_sm.csv *
- MV_Ramp_SL2030.csv
- MV_Road_SL2030_sm.csv*
- MV_Speed_SL2030.csv
- hpmsVMTxBinS_SL2030.csv*
- Summary_SL2030.csv

**Note – "S" and "sm" denote summer season files. Winter season files are also created and denoted with "W" and "wt".*

# MOVES Input File Example:
# Speed Profile By Vehicle, Road, Hour, Day, & Speed Bin
## Salt Lake County 2030

| sourceTypeID | roadTypeID | hourDayID | avgSpeedBinID | avgSpeedFraction |
|---|---|---|---|---|
| 21 | 5 | 85 | 1 | 0.0079 |
| 21 | 5 | 85 | 2 | 0.0963 |
| 21 | 5 | 85 | 3 | 0.0108 |
| 21 | 5 | 85 | 4 | 0.0153 |
| 21 | 5 | 85 | 5 | 0.0453 |
| 21 | 5 | 85 | 6 | 0.1969 |
| 21 | 5 | 85 | 7 | 0.2776 |
| 21 | 5 | 85 | 8 | 0.2057 |
| 21 | 5 | 85 | 9 | 0.103 |
| 21 | 5 | 85 | 10 | 0.0282 |
| 21 | 5 | 85 | 11 | 0.0081 |
| 21 | 5 | 85 | 12 | 0.0048 |
| 21 | 5 | 85 | 13 | 0 |
| 21 | 5 | 85 | 14 | 0 |
| 21 | 5 | 85 | 15 | 0 |
| 21 | 5 | 85 | 16 | 0 |
| 21 | 5 | 95 | 1 | 0 |
| 21 | 5 | 95 | 2 | 0.0037 |
| 21 | 5 | 95 | 3 | 0.0061 |
| 21 | 5 | 95 | 4 | 0.0073 |
| 21 | 5 | 95 | 5 | 0.0674 |
| 21 | 5 | 95 | 6 | 0.2075 |
| 21 | 5 | 95 | 7 | 0.3132 |
| 21 | 5 | 95 | 8 | 0.2022 |
| 21 | 5 | 95 | 9 | 0.1388 |
| 21 | 5 | 95 | 10 | 0.0338 |
| 21 | 5 | 95 | 11 | 0.0153 |
| 21 | 5 | 95 | 12 | 0.0046 |
| 21 | 5 | 95 | 13 | 0 |
| 21 | 5 | 95 | 14 | 0 |
| 21 | 5 | 95 | 15 | 0 |
| 21 | 5 | 95 | 16 | 0 |

# MOVES Input File Example:
# VMT By Vehicle Type
## Salt Lake County 2030 Winter

| HPMSVtypeID | yearID | HPMSBaseYearVMT | baseYearOffNetVMT |
|---|---|---|---|
| 10 | 2030 | 187661 | 0 |
| 20 | 2030 | 13482605 | 0 |
| 30 | 2030 | 22174384 | 0 |
| 40 | 2030 | 83189 | 0 |
| 50 | 2030 | 742200 | 0 |
| 60 | 2030 | 1249629 | 0 |

MOVES Input File Example:

# Ramp Fraction

Salt Lake County 2030

| roadTypeID | rampFraction |
|---|---|
| 2 | 0 |
| 4 | 0.121 |

# MOVES Input File Example:
# Road Type Distribution By Vehicle Type

## Salt Lake County 2030

| sourceTypeID | roadTypeID | roadTypeVMTFraction |
|---|---|---|
| 21 | 1 | 0 |
| 21 | 2 | 0 |
| 21 | 3 | 0 |
| 21 | 32 | 0 |
| 21 | 4 | 0.4552 |
| 21 | 5 | 0.382 |
| 21 | 52 | 0.1629 |
| 31 | 1 | 0 |
| 31 | 2 | 0 |
| 31 | 3 | 0 |
| 31 | 32 | 0 |
| 31 | 4 | 0.4332 |
| 31 | 5 | 0.3739 |
| 31 | 52 | 0.1929 |
| 41 | 1 | 0 |
| 41 | 2 | 0 |
| 41 | 3 | 0 |
| 41 | 32 | 0 |
| 41 | 4 | 0.3813 |
| 41 | 5 | 0.5925 |
| 41 | 52 | 0.0261 |
| 51 | 1 | 0 |
| 51 | 2 | 0 |
| 51 | 3 | 0 |
| 51 | 32 | 0 |
| 51 | 4 | 0.3999 |
| 51 | 5 | 0.534 |
| 51 | 52 | 0.0661 |
| 61 | 1 | 0 |
| 61 | 2 | 0 |
| 61 | 3 | 0 |
| 61 | 32 | 0 |
| 61 | 4 | 0.5726 |
| 61 | 5 | 0.3986 |
| 61 | 52 | 0.0287 |

Note - new road types created for rural local (32) and urban local (52) *(optional)*

Also note the difference in local road percentage for passenger cars (16.2%) and heavy trucks (2.8%)

# V. Emission Calculations
*look-up tables*

- Run MOVES: emission rates
  - Rates lookup table: by speed bin & facility
  - Can be reused
- VMT summary: by speed bin & facility
- Spreadsheet: Emissions = rates * VMT

# Sample MOVES Emission Rates
## Modified as Excel lookup table

| Index | County | yearID | monthID | dayID | hourID | linkID | pollutantID | processID | roadTypeID | avgSpeedBinID | ratePerDistance |
|---|---|---|---|---|---|---|---|---|---|---|---|
| SL_2008_NOx_RunEx_A_1 | SL | 2008 | 1 | 5 | 1 | 490350501 | NOx | RunEx | A | 1 | 4.46209 |
| SL_2008_NOx_RunEx_A_2 | SL | 2008 | 1 | 5 | 1 | 490350502 | NOx | RunEx | A | 2 | 2.64693 |
| SL_2008_NOx_RunEx_A_3 | SL | 2008 | 1 | 5 | 1 | 490350503 | NOx | RunEx | A | 3 | 1.86211 |
| SL_2008_NOx_RunEx_A_4 | SL | 2008 | 1 | 5 | 1 | 490350504 | NOx | RunEx | A | 4 | 1.65442 |
| SL_2008_NOx_RunEx_A_5 | SL | 2008 | 1 | 5 | 1 | 490350505 | NOx | RunEx | A | 5 | 1.53544 |
| SL_2008_NOx_RunEx_A_6 | SL | 2008 | 1 | 5 | 1 | 490350506 | NOx | RunEx | A | 6 | 1.45602 |
| SL_2008_NOx_RunEx_A_7 | SL | 2008 | 1 | 5 | 1 | 490350507 | NOx | RunEx | A | 7 | 1.38056 |
| SL_2008_NOx_RunEx_A_8 | SL | 2008 | 1 | 5 | 1 | 490350508 | NOx | RunEx | A | 8 | 1.3413 |
| SL_2008_NOx_RunEx_A_9 | SL | 2008 | 1 | 5 | 1 | 490350509 | NOx | RunEx | A | 9 | 1.36536 |
| SL_2008_NOx_RunEx_A_10 | SL | 2008 | 1 | 5 | 1 | 490350510 | NOx | RunEx | A | 10 | 1.38655 |
| SL_2008_NOx_RunEx_A_11 | SL | 2008 | 1 | 5 | 1 | 490350511 | NOx | RunEx | A | 11 | 1.40248 |
| SL_2008_NOx_RunEx_A_12 | SL | 2008 | 1 | 5 | 1 | 490350512 | NOx | RunEx | A | 12 | 1.41631 |
| SL_2008_NOx_RunEx_A_13 | SL | 2008 | 1 | 5 | 1 | 490350513 | NOx | RunEx | A | 13 | 1.43723 |
| SL_2008_NOx_RunEx_A_14 | SL | 2008 | 1 | 5 | 1 | 490350514 | NOx | RunEx | A | 14 | 1.48416 |
| SL_2008_NOx_RunEx_A_15 | SL | 2008 | 1 | 5 | 1 | 490350515 | NOx | RunEx | A | 15 | 1.53439 |
| SL_2008_NOx_RunEx_A_16 | SL | 2008 | 1 | 5 | 1 | 490350516 | NOx | RunEx | A | 16 | 1.56722 |

***Note: This table can be reused for instantaneous emission calculations.***

# Index for Emission Rate Look Up Tables

*Sample*

**SL_2008_NOx_RunEx_A_1**

**County – Year – Pollutant – Process – Road Type – Speed Bin**

# VMT Totals by Speed Bin and Road Type
## (Lookup table: can be used with emission rate table)

| Index | Speed Bin | RMP_VMT | FWY_VMT | ART_VMT | LCL_VMT |
|---|---|---|---|---|---|
| SL2030W_1 | 1 | - | - | 3,502 | - |
| SL2030W_2 | 2 | 26,998 | - | 69,880 | - |
| SL2030W_3 | 3 | 134,794 | 3,014 | 106,573 | 2,768,581 |
| SL2030W_4 | 4 | 157,030 | 14,219 | 269,776 | 3,823,279 |
| SL2030W_5 | 5 | 184,980 | 50,063 | 897,561 | - |
| SL2030W_6 | 6 | 30,442 | 92,124 | 2,721,698 | - |
| SL2030W_7 | 7 | 3,649 | 209,723 | 4,048,567 | - |
| SL2030W_8 | 8 | - | 611,216 | 3,282,539 | - |
| SL2030W_9 | 9 | - | 466,449 | 2,027,823 | - |
| SL2030W_10 | 10 | - | 467,461 | 640,145 | - |
| SL2030W_11 | 11 | - | 926,352 | 289,876 | - |
| SL2030W_12 | 12 | - | 1,539,872 | 97,369 | - |
| SL2030W_13 | 13 | - | 1,734,102 | - | - |
| SL2030W_14 | 14 | - | 9,322,568 | - | - |
| SL2030W_15 | 15 | - | 694,546 | - | - |
| SL2030W_16 | 16 | - | 203,144 | - | - |

# Summary File

| Index | VMT_model | VHT_model | HPMS factor | VMT-hpms | VMT-hpms Summer | VMT-hpms Winter | VHT-hpms | speed | delay |
|---|---|---|---|---|---|---|---|---|---|
| SL2030_TOTAL | 36,023,953 | 1,064,396 | _ _ | 38,713,875 | 39,274,242 | 37,919,914 | 1,364,039 | 33.84 | 130,203 |
| | | | | | | | | | |
| SL2030_RMP | 586,073 | 42,357 | 0.928 | 543,876 | 549,315 | 537,894 | 39,308 | 13.84 | 17,302 |
| SL2030_FWY | 17,797,989 | 307,661 | 0.928 | 16,516,534 | 16,681,699 | 16,334,852 | 285,509 | 57.85 | 40,196 |
| SL2030_ART | 15,190,722 | 524,520 | 0.979 | 14,871,717 | 15,139,408 | 14,455,309 | 513,505 | 28.96 | 72,622 |
| SL2030_LCL | 2,449,169 | 189,858 | 2.769 | 6,781,749 | 6,903,820 | 6,591,860 | 525,717 | 12.9 | 82 |
| | | | | | | | | | |
| SL2030_AM | 6,514,744 | 189,566 | _ _ | 6,879,696 | 6,977,031 | 6,743,377 | 235,064 | 34.37 | 28,215 |
| SL2030_MD | 11,993,167 | 338,500 | _ _ | 13,007,727 | 13,198,164 | 12,736,377 | 447,489 | 35.43 | 20,292 |
| SL2030_PM | 9,594,447 | 331,859 | _ _ | 10,302,134 | 10,452,605 | 10,087,978 | 408,488 | 28.91 | 80,836 |
| SL2030_EV | 7,921,596 | 204,471 | _ _ | 8,524,319 | 8,646,442 | 8,352,182 | 272,999 | 38.74 | 861 |
| | | | | | | | | | |
| SL2030_RMP_AM | 99,533 | 7,281 | 0.928 | 92,367 | 93,290 | 91,351 | 6,757 | 13.67 | 3,026 |
| SL2030_RMP_MD | 200,685 | 14,657 | 0.928 | 186,236 | 188,098 | 184,188 | 13,602 | 13.69 | 6,076 |
| SL2030_RMP_PM | 142,691 | 13,546 | 0.928 | 132,418 | 133,742 | 130,961 | 12,571 | 10.53 | 7,441 |
| SL2030_RMP_EV | 143,164 | 6,873 | 0.928 | 132,856 | 134,184 | 131,394 | 6,378 | 20.83 | 760 |
| | | | | | | | | | |
| SL2030_FWY_AM | 3,469,958 | 61,925 | 0.928 | 3,220,121 | 3,252,322 | 3,184,699 | 57,467 | 56.03 | 9,881 |
| SL2030_FWY_MD | 5,685,897 | 90,201 | 0.928 | 5,276,512 | 5,329,277 | 5,218,470 | 83,707 | 63.04 | 4,567 |
| SL2030_FWY_PM | 4,567,242 | 94,320 | 0.928 | 4,238,400 | 4,280,784 | 4,191,778 | 87,529 | 48.42 | 25,746 |
| SL2030_FWY_EV | 4,074,893 | 61,215 | 0.928 | 3,781,500 | 3,819,315 | 3,739,904 | 56,808 | 66.57 | 2 |
| | | | | | | | | | |
| SL2030_ART_AM | 2,563,239 | 90,746 | 0.979 | 2,509,411 | 2,554,580 | 2,439,147 | 88,840 | 28.25 | 15,295 |
| SL2030_ART_MD | 5,231,371 | 165,796 | 0.979 | 5,121,512 | 5,213,699 | 4,978,110 | 162,314 | 31.55 | 9,619 |
| SL2030_ART_PM | 4,242,404 | 174,217 | 0.979 | 4,153,314 | 4,228,073 | 4,037,021 | 170,559 | 24.35 | 47,628 |
| SL2030_ART_EV | 3,153,709 | 93,760 | 0.979 | 3,087,481 | 3,143,055 | 3,001,031 | 91,791 | 33.64 | 81 |
| | | | | | | | | | |
| SL2030_LCL_AM | 382,014 | 29,614 | 2.769 | 1,057,798 | 1,076,838 | 1,028,179 | 82,000 | 12.9 | 13 |
| SL2030_LCL_MD | 875,214 | 67,846 | 2.769 | 2,423,467 | 2,467,089 | 2,355,610 | 187,866 | 12.9 | 30 |
| SL2030_LCL_pm | 642,110 | 49,776 | 2.769 | 1,778,002 | 1,810,006 | 1,728,218 | 137,830 | 12.9 | 22 |
| SL2030_LCL_EV | 549,831 | 42,623 | 2.769 | 1,522,482 | 1,549,887 | 1,479,853 | 118,022 | 12.9 | 18 |

# VI. Other MOVES Adaptations
## Daily VMT Inputs

- **MOVES = Annual**
- **Conformity = Daily**

# Daily VMT Inputs
# Modified MOVES tables

- Monthvmfraction
  - design month = 1
  - all others = 0
- Dayvmtfractions
  - design month:
    - roadTypeID = 1-5, 32, 52
    - dayID = 5
    - dayVMTFraction = 1
  - all other days = 0
- Hourvmtfraction
  - all dayID (2) = 0
  - all dayID (5) = MOVES default
- Monthofanyyear
  - all noOfDays =1
- Dayofanyweek
  - noOfRealDays for weekend = 0
  - noOfRealDays for Weekdays=7

# Daily VMT Inputs

- Modify default database
  - MOVESdb_21010515
- Save modified database
  - UtahDailyMOVESdb_21010515
- Set modified database as default
  - MOVES gui: *Settings/Configure MOVES*
- **Another webinar?**

# V. Other MOVES Adaptations
## New Road Type For Local Roads

- *THIS IS OPTIONAL!*
- Local Roads = residential streets
- Less truck activity on locals
- Mobile6 separated local roads
- MOVES combines locals with arterials
  - Truck activity on local roads exaggerated
- **Another webinar?**

# The End

Questions?