

**UPDATING THE FREIGHT TRUCK STOCK ADJUSTMENT MODEL:
1997 VEHICLE INVENTORY AND USE SURVEY DATA**

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November 2000

Prepared for the
Energy Information Administration
U.S. Department of Energy

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UT-BATTELLE, LLC
for the
U.S. DEPARTMENT OF ENERGY
under Contract No. DE-AC05-00OR22725

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ABSTRACT

The Energy Information Administration's (EIA's) National Energy Modeling System (NEMS) Freight Truck Stock Adjustment Model (FTSAM) was created in 1995 relying heavily on input data from the *1992 Economic Census, Truck Inventory and Use Survey* (TIUS). The FTSAM is part of the NEMS Transportation Sector Model, which provides baseline energy projections and analyzes the impacts of various technology scenarios on consumption, efficiency, and carbon emissions. The base data for the FTSAM can be updated every five years as new *Economic Census* information is released.

Because of expertise in using the TIUS database, Oak Ridge National Laboratory (ORNL) was asked to assist the EIA when the new *Economic Census* data were available. ORNL provided the necessary base data from the *1997 Vehicle Inventory and Use Survey* (VIUS) and other sources to update the FTSAM.¹

The next *Economic Census* will be in the year 2002. When those data become available, the EIA will again want to update the FTSAM using the VIUS. This report, which details the methodology of estimating and extracting data from the 1997 VIUS Microdata File, should be used as a guide for generating the data from the next VIUS so that the new data will be as compatible as possible with the data in the model.

¹The U.S. Census Bureau changed the survey name from *Truck Inventory and Use Survey* to *Vehicle Inventory and Use Survey* in 1997 in anticipation of including other vehicle types; however, the budget did not allow additional vehicle types to be included in the 1997 survey.

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INTRODUCTION

The Energy Information Administration's (EIA's) National Energy Modeling System (NEMS) Freight Truck Stock Adjustment Model (FTSAM) was created in 1995 relying heavily on input data from the *1992 Economic Census, Truck Inventory and Use Survey* (TIUS). The FTSAM is part of the NEMS Transportation Sector Model, which provides baseline energy projections and analyzes the impacts of various technology scenarios on consumption, efficiency, and carbon emissions. (Decision Analysis Corporation of Virginia, 1995, p. 1) The base data for the FTSAM can be updated every five years as new *Economic Census* information is released.

OBJECTIVE

Because of expertise in using the TIUS database, Oak Ridge National Laboratory (ORNL) was asked to assist the EIA when the new *Economic Census* data were available. ORNL provided the necessary base data from the *1997 Vehicle Inventory and Use Survey* (VIUS) to update the FTSAM.¹ (U.S. Census Bureau, 2000) EIA provided a listing of 11 data tabulations necessary to update the FTSAM and a list of definitions for the data elements (See Appendix A). This report documents the procedure used for producing those data.

VIUS DATA PREPARATION

The VIUS database was transferred from its original MS-Access format to Statistical Analysis Software (SAS[®]) format and the data were verified by comparing totals of trucks and truck-miles against the published VIUS report. (U.S. Census Bureau, 1999, Table 2a) Since the FTSAM is a freight truck model, the light trucks (less than 10,000 pounds gross vehicle weight) were excluded from the analysis on the basis that they are not freight trucks.

¹The U.S. Census Bureau changed the survey name from *Truck Inventory and Use Survey* to *Vehicle Inventory and Use Survey* in 1997 in anticipation of including other vehicle types; however, the budget did not allow additional vehicle types to be included in the 1997 survey.

Preliminary checks of the VIUS data indicated that most data elements required for this project were complete (i.e., non-missing). However, two important data elements had missing values. The fuel type was missing for 2% of all medium/heavy trucks and the fleet/non-fleet indicator was missing for 14% of all medium/heavy trucks. The missing data were imputed using the existing data proportions by size class (see Tables 1 and 2).

Table 1.
Share of Trucks by Fuel Type and Truck Size –
Used to Impute Missing Fuel Types

Fuel type	Medium trucks	Heavy trucks
Gasoline	56.9%	9.7%
Diesel	41.3%	90.2%
Liquified Petroleum Gas (LPG)	1.6%	0.1%
Other ^a	0.2%	0.1%
Total	100.0%	100.0%

^a The “Other” fuel type was assumed to be compressed natural gas (CNG).

Table 2.
Share of Trucks by Operator Class, Truck Size, and Fleet Indicator –
Used to Impute Missing Fleet Indicators

Operator class	Medium trucks		Heavy trucks	
	Non-fleet	Fleet	Non-fleet	Fleet
Business	62.3%	37.7%	47.7%	52.3%
For-Hire	21.9%	78.2%	29.3%	70.7%
Mixed	100.0%	0.0%	97.0%	3.0%

Note: It was assumed that all trucks with operator class equal to “personal” were 100% non-fleet vehicles and all trucks with operator class equal to “daily rental” were 100% fleet vehicles.

Next, the VIUS principal products (PRNPRO) were mapped into NEMS Industrial sectors as shown in Table 3. There were eleven VIUS principal products which could not be mapped directly into the sectors (see Table 4). Thus, following the original FTSAM methodology, these vehicles were allocated among NEMS sectors 1–10 using the existing data proportions (see Table 5). Using

the VIUS principal product codes, one cannot determine whether the vehicle belongs to the utility sector; however, the VIUS major use code can identify which trucks belong in the utility sector. Therefore, any record having VIUS major use (MAJUSE) equal to “utility,” regardless of principal product, was changed to NEMS sector 11 – Utility. (Decision Analysis Corporation of Virginia, 1995, p. A-4.)

Table 3.
VIUS Principal Products Mapped to NEMS Industrial Sectors

VIUS Principal Product		NEMS Industrial Sector	
09 11	Chemicals Plastics and/or rubber	1	Chemicals, rubber and plastics
12	Primary metal products	2	Primary metals
03	Processed foods	3	Processed foods
08	Paper products	4	Paper processing
10	Petroleum	5	Petroleum products
05 26	Building materials Glass products	6	Stone, clay, glass, and concrete
13 14 15 19	Fabricated metal products Machinery Transportation equipment Craftsman’s equipment	7	Metal durables
17 16 07 27 18	Textile mill products Furniture or hardware Lumber and fabricated wood products Miscellaneous manufacturing Household goods	8	Other manufacturing
01 02 30 06	Farm products Live animals Animal feed Logs and forest products	9	Agriculture
04	Mining products	10	Mining
–	Utility (If MAJUSE = 09)	11	Utility
–	Not included in VIUS	12	Government

Table 4.
VIUS Principal Products Not Mapped to NEMS Industrial Sectors

28	Industrial waste water		24	Personal transportation
21	Scrap, refuse or garbage		33	Passengers
20	Mixed cargos		23	No load carried
32	Recyclable products		25	Not in use
29	EPA hazardous waste		22	Other
31	Non-EPA hazardous waste			

Table 5.
Shares of VIUS Principal Products
Used to Reallocate “Unmapped” Principal Products

	NEMS Industrial Sector	Shares
1	Chemicals, rubber and plastics	5.0%
2	Primary metals	2.4%
3	Processed foods	11.1%
4	Paper processing	2.5%
5	Petroleum products	4.1%
6	Stone, clay, glass, and concrete	18.3%
7	Metal durables	20.0%
8	Other manufacturing	13.6%
9	Agriculture	22.2%
10	Mining	0.9%

GOVERNMENT TRUCKS

Since the scope of the VIUS does not include government trucks, these data had to be added into the database. The total number of Federal plus State and Local Government trucks was obtained from the *1997 Highway Statistics*. (U.S. Department of Transportation, 1998, Table MV-9) Total Government trucks were then split into size classes using percentages from the report *Fleet Vehicles in the United States*. (Miaou, et al., 1992, Table A-2) According to that report, 13.2% of all Government trucks are medium trucks and 3.5% are heavy trucks. Once the

medium and heavy government trucks were added into the database, their fuel types and ages were allocated in the same proportions as the VIUS vehicles. All Government trucks were classified as fleet vehicles.

FINAL DATA

Once the missing VIUS data were imputed, the NEMS Industrial sectors were set up, and the government trucks were included, the final data tabulations were generated from the database. The output was a large tab-delimited file containing all of the data. This file was then imported into a Lotus 123 spreadsheet file and formatted to the final product, a hardcopy of which is in Appendix C. A quality check was also performed on the data; any cell in a table which was based on a sample of 5 VIUS records or less was “blanked out” for quality purposes.

SUMMARY AND RECOMMENDATIONS

ORNL used SAS[®] to estimate and extract data from the Census Bureau’s 1997 VIUS Microdata File to assist EIA in updating the FTSAM. Other sources used in the estimation process were the *Highway Statistics 1997* and *Fleet Vehicles in the United States*. The *NEMS Transportation Sector Model: Freight Truck Stock Adjustment Model Update*, which details the original creation of the FTSAM, was used as a guide to assist with compatibility between the 1992 FTSAM base data and 1997 data. The final data were delivered to EIA in spreadsheet format.

The next Economic Census will be in the year 2002. When those data become available, the EIA will again want to update the FTSAM using the VIUS. This report, which details the methodology of estimating and extracting data from the 1997 VIUS Microdata File, should be used as a guide for generating the data from the next VIUS so that the new data will be as compatible as possible with the data in the model.

REFERENCES

- Decision Analysis Corporation of Virginia, *NEMS Transportation Sector Model: Freight Truck Stock Adjustment Model Update*, Vienna, VA, November 1995, Appendix A.
- Miaou, Shaw-Pin, Patricia S. Hu, and Jennifer R. Young, Oak Ridge National Laboratory, *Fleet Vehicles in the United States: Composition, Operating Characteristics, and Fueling Practices*, ORNL-6717, May 1992, Table A-2.
- U.S. Census Bureau, *1997 Economic Census, Vehicle Inventory and Use Survey, United States*, EC97TV-US, Washington, DC, October 1999, Table 2a.
- U.S. Census Bureau, 1997 Vehicle Inventory and Use Survey, Microdata File, CD-EC97-VIUS, Washington, DC, January 2000.
- U.S. Department of Transportation, Federal Highway Administration, *Highway Statistics 1997*, FHWA-PL-98-020, Washington, DC, December 1998, Tables MV-9 and VM-1.

APPENDIX A EIA REQUEST AND DEFINITIONS

Table A-1.
Data Requested by EIA

TABLE	EIA VARIABLE	DATA NEEDED	SECTOR	SIZE CLASS	FUEL TYPE	FLEET/ NON-FLEET	AGE
1	Base year market share of each fuel type	Number of NEW trucks		X	X	X	
2	Parameter representing the tendency of each sector to purchase diesel trucks	Number of DIESEL trucks	X	X		X	
3	Base year alternative fuel share	Number of NEW ALTERNATIVE FUEL trucks	X	X	X	X	
4	Base year truck stock	Number of trucks	X	X	X	X	X
5	Fleet transfer rates	Number of FLEET trucks	X	X		X	X
6	Base year annual vehicle miles traveled per truck	Average annual vehicle miles traveled per truck	X	X	X		X
7	Base year vehicle miles traveled	Total vehicle miles traveled	X				
8	Vehicle miles of travel size class allocation factor	Total vehicle miles traveled	X	X			
9	Fleet share of truck purchases	Number of NEW FLEET trucks	X	X			
10	Truck share of miles in urban areas	Share of miles driven in URBAN areas ¹		X			
11	Base year fuel economy	Average fuel economy ²		X	X		X

¹ VIUS does not contain this information; *Highway Statistics 1997* was used. (U.S. Department of Transportation, 1998, Table VM-1.)

² Medium trucks with fuel economy over 13 miles per gallon and heavy trucks over 11 miles per gallon were not used for this data estimation in order to be compatible with original model methodology. (Decision Analysis Research Corporation of Virginia, 1995, p. A-15.)

Table A-2.
EIA Data Element Definitions

Sector	Chemicals, rubber and plastics Primary metals Processed foods Paper processing Petroleum products Stone, clay, glass, and concrete Metal durables Other manufacturing Agriculture Mining Utility Government
Size class	Medium trucks (10,000–26,000 pounds gross vehicle weight) Heavy trucks (greater than 26,000 pounds gross vehicle weight)
Fuel type	Diesel Gasoline Liquefied Petroleum Gas Compressed Natural Gas
Fleet/Non-fleet	Fleet (10 or more vehicles) Non-fleet (less than 10 vehicles)
Age	New 1 year old 2 year old 3 year old 4 year old 5 year old 6 year old 7 year old 8 year old 9 year old 10 years old or older

APPENDIX B SAS PROGRAMS

These programs were run using PC-SAS Version 6.11 on a Dell Dimension XPS T550 personal computer. Program 1 generates data to use to impute missing data elements. Program 2 adds government trucks to the VIUS file, imputes the necessary data elements for government and non-government trucks, and creates the NEMS Industrial sector. Program 3 creates the tabulations requested by EIA. The table numbers in Program 3 match those on the table descriptions in Appendix A. Program 4 is exactly the same as Program 3 except the number of records is tabulated instead of the number of trucks. This was used to determine data which were not of acceptable quality. Any cell in a table which was based on 5 VIUS records or less was “blanked out” for quality purposes. (Government vehicle data were not “blanked out” on this basis, because the few government records which were in the database were created in Program 2 using adequate VIUS data.)

Please note that in Programs 3 and 4, the Proc Tabulate options “NOSEPS FORMCHAR='0900000000900090000000'X” indicate that the output should be tab-delimited instead of the usual Proc Tabulate separator. The tab-delimited output is easily imported into any spreadsheet software (e.g., Lotus 123, MS-Excel).


```

*****;
** NEMS FREIGHT MODEL PROGRAMMING **;
**          PROGRAM 1          **;
** OAK RIDGE NATIONAL LABORATORY **;
** MAY 2000          STACY C DAVIS **;
*****;

```

```
LIBNAME D 'D:\TIUS\VIUS97\DATA' ;
```

```
** FORMAT SECTION **;
```

```
PROC FORMAT;
```

```
VALUE $FUELTYP
```

```

' 1' = ' GASOLINE'
' 2' = ' GASOLINE'
' 3' = ' DIESEL'
' 4' = ' LPG'
' 5' = ' CNG'
;

```

```
VALUE $SIZECLAS
```

```

' 1' = ' LIGHT'
' 2' = ' LIGHT'
' 3' = ' MEDIUM'
' 4' = ' MEDIUM'
' 5' = ' MEDIUM'
' 6' = ' MEDIUM'
' 7' = ' HEAVY'
' 8' = ' HEAVY'
;

```

```
VALUE $FLSTAT
```

```

' 01' = ' NON-FLEET'
' 02' = ' NON-FLEET'
' 03' = ' NON-FLEET'
' 04' = ' FLEET'
' 05' = ' FLEET'
' 06' = ' FLEET'
' 07' = ' FLEET'

```

' 08' = ' FLEET'
' 09' = ' FLEET'
' 10' = ' FLEET'
;

VALUE \$PROD

' 01' = ' 09'
' 02' = ' 09'
' 03' = ' 03'
' 04' = ' 10'
' 05' = ' 06'
' 06' = ' 09'
' 07' = ' 08'
' 08' = ' 04'
' 09' = ' 01'
' 10' = ' 05'
' 11' = ' 01'
' 12' = ' 02'
' 13' = ' 07'
' 14' = ' 07'
' 15' = ' 07'
' 16' = ' 08'
' 17' = ' 08'
' 18' = ' 08'
' 19' = ' 07'
' 26' = ' 06'
' 27' = ' 08'
' 20' = ' 99'
' 21' = ' 99'
' 22' = ' 99'
' 23' = ' 99'
' 24' = ' 99'
' 25' = ' 99'
' 28' = ' 99'
' 29' = ' 99'
' 30' = ' 09'
' 31' = ' 99'
' 32' = ' 99'

```
' 33' = ' 99'  
;
```

```
VALUE $CLASS
```

```
' 1' = ' BUSINESS'  
' 3' = ' FOR- HIRE'  
' 5' = ' MIXED'  
;
```

```
** SET UP THE DATABASE **;  
TITLE ' VIUS97' ;
```

```
DATA VIUS97; SET D.VIUS97;  
WHERE PKGVW NOT IN (' 1', ' 2'); ** GET RID OF THE LIGHT VEHICLES  
**;  
SECTOR1 = PUT (PRNPRO, $PROD.);
```

```
*****;  
** GET SHARES FOR USE IN IMPUTING MISSING VALUES **;  
** AND SETTING UP THE PRODUCT SECTORS **;  
*****;
```

```
** SECTOR SHARES **;  
PROC TABULATE DATA=VIUS97;  
WHERE SECTOR1 NE ' 99';  
CLASS SECTOR1;  
VAR EXPANF;  
TABLES (SECTOR1=' NEMS SECTOR' ALL), EXPANF=' TRUCKS' *PCTSUM*F=6. 2;  
TITLE2 ' NON-MISSING SECTOR SHARES FOR USE IN ALLOCATING  
12 PRNPRO THAT DO NOT GO ELSEWHERE' ;
```

```
** FUEL TYPE SHARES **;  
PROC TABULATE DATA=VIUS97;  
WHERE ENGTYP NE ' ' ;  
CLASS PKGVW ENGTYP;  
FORMAT PKGVW $SIZECLAS. ENGTYP $FUELTY. ;  
VAR EXPANF;  
TABLES (ENGTYP=' FUEL TYPE' ALL), PKGVW=' ' ;
```

```
*EXPANF=' TRUCKS' *PCTSUM<ENGTYP ALL>*F=6. 2;  
TITLE2 'NON-MISSING FUEL TYPE SHARES FOR USE IN  
IMPUTING MISSING VALUES';
```

```
** SHARES BY OPERATOR CLASS, TRUCK SIZE, AND FLEET INDICATOR **;  
PROC TABULATE DATA=VIUS97;  
WHERE FLTSZE NE ' ' AND OPCLAS IN (' 1', ' 3', ' 5');  
CLASS PKGVW OPCLAS FLTSZE;  
FORMAT PKGVW $SIZECLAS. FLTSZE $FLSTAT. OPCLAS $CLASS. ;  
VAR EXPANF;  
TABLES OPCLAS, PKGVW=' ' *(FLTSZE=' ' ALL)  
*EXPANF=' TRUCKS' *PCTSUM<FLTSZE ALL>*F=6. 2;  
TITLE2 'NON-MISSING FLEET INDICATOR SHARES BY OPERATOR CLASS  
AND SIZE CLASS';  
TITLE3 'FOR USE IN IMPUTING MISSING VALUES';  
RUN;
```

```
** AGE SHARES FOR GOVERNMENT TRUCKS **;  
PROC TABULATE DATA=VIUS97;  
CLASS MDLYR PKGVW;  
FORMAT PKGVW $SIZECLAS. ;  
VAR EXPANF;  
TABLE MDLYR ALL, PKGVW=' ' *EXPANF=' TRUCKS' *  
PCTSUM<MDLYR ALL>*F=6. 2;  
TITLE2 'AGE SHARES FOR USE IN IMPUTING AGE VALUES  
FOR GOVERNMENT TRUCKS';  
RUN;
```

```
*****;  
** NEMS FREIGHT MODEL PROGRAMMING **;  
** PROGRAM 2 **;  
** OAK RIDGE NATIONAL LABORATORY **;  
** JUNE 2000 STACY C DAVIS **;  
*****;
```

```
LIBNAME D 'D:\TIUS\VIUS97\DATA' ;
```

```
*****;  
** FORMAT SECTION **;  
*****;
```

```
PROC FORMAT;
```

```
VALUE $SIZECLAS
```

```
' 1' = ' LIGHT'  
' 2' = ' LIGHT'  
' 3' = ' MEDIUM'  
' 4' = ' MEDIUM'  
' 5' = ' MEDIUM'  
' 6' = ' MEDIUM'  
' 7' = ' HEAVY'  
' 8' = ' HEAVY'  
;
```

```
VALUE $FLSTAT
```

```
' 01' = ' NON-FLEET'  
' 02' = ' NON-FLEET'  
' 03' = ' NON-FLEET'  
' 04' = ' FLEET'  
' 05' = ' FLEET'  
' 06' = ' FLEET'  
' 07' = ' FLEET'  
' 08' = ' FLEET'  
' 09' = ' FLEET'  
' 10' = ' FLEET'  
;
```

VALUE \$PROD

' 01' = ' 09'
' 02' = ' 09'
' 03' = ' 03'
' 04' = ' 10'
' 05' = ' 06'
' 06' = ' 09'
' 07' = ' 08'
' 08' = ' 04'
' 09' = ' 01'
' 10' = ' 05'
' 11' = ' 01'
' 12' = ' 02'
' 13' = ' 07'
' 14' = ' 07'
' 15' = ' 07'
' 16' = ' 08'
' 17' = ' 08'
' 18' = ' 08'
' 19' = ' 07'
' 26' = ' 06'
' 27' = ' 08'
' 20' = ' 99'
' 21' = ' 99'
' 22' = ' 99'
' 23' = ' 99'
' 24' = ' 99'
' 25' = ' 99'
' 28' = ' 99'
' 29' = ' 99'
' 30' = ' 09'
' 31' = ' 99'
' 32' = ' 99'
' 33' = ' 99'
' 77' = ' 12'
;

```

*****;
** CREATE A DATASET WHICH HAS INFORMATION ON **;
** GOVERNMENT TRUCKS. THE FIRST RECORD IS **;
** MEDIUM TRUCKS. THE SECOND RECORD IS HEAVY **;
** TRUCKS. THESE RECORDS WILL GET IMPUTED **;
** VALUES FOR FUEL TYPE AND AGE **;
*****;

```

DATA GOVT;

LENGTH EXPANF 8 PKGVW \$2 PRNPRO \$2 FLTSZE \$2;

INPUT EXPANF PKGVW PRNPRO FLTSZE;

CARDS;

260912 3 77 04

069065 8 77 04

;

** SET UP DATASET **;

DATA VIUS97; SET D.VIUS97 GOVT;

WHERE PKGVW NOT IN ('1', '2'); **GET RID OF THE LIGHT VEHICLES **;

SECTOR = PUT (PRNPRO, \$PROD.);

SIZE = PUT (PKGVW, \$SIZECLAS.);

```

*****;
** IMPUTE MISSING FUEL VALUES **;
** (INCLUDING GOVT TRUCKS) **;
*****;

```

DATA HAVEFUEL MISSFUEL(DROP=EXPANF RENAME=(NEWEXP=EXPANF));

SET VIUS97;

IF ENGTYP NE ' ' THEN OUTPUT HAVEFUEL;

ELSE DO;

IF SIZE='MEDIUM' THEN DO;

NEWEXP=EXPANF*0.5691; ENGTYP='2'; OUTPUT MISSFUEL;

NEWEXP=EXPANF*0.4133; ENGTYP='3'; OUTPUT MISSFUEL;

NEWEXP=EXPANF*0.0155; ENGTYP='4'; OUTPUT MISSFUEL;

```
NEWEXP=EXPANF*0.0021; ENGTYP=' 5' ; OUTPUT MISSFUEL;
END;
```

```
IF SIZE=' HEAVY' THEN DO;
NEWEXP=EXPANF*0.0967; ENGTYP=' 2' ; OUTPUT MISSFUEL;
NEWEXP=EXPANF*0.9016; ENGTYP=' 3' ; OUTPUT MISSFUEL;
NEWEXP=EXPANF*0.0010; ENGTYP=' 4' ; OUTPUT MISSFUEL;
NEWEXP=EXPANF*0.0007; ENGTYP=' 5' ; OUTPUT MISSFUEL;
END;
```

```
END;
```

```
*****;
** IMPUTE MISSING AGE          **;
** (GOV' T ONLY, VIUS ARE ALL **;
** FILLED IN)                  **;
*****;
```

```
DATA HAVEAGE MESSAGE(DROP=EXPANF RENAME=(NEWEXP=EXPANF)); SET
HAVEFUEL MISSFUEL;
IF MDLYR NE ' ' THEN OUTPUT HAVEAGE;
ELSE DO;
```

```
IF SIZE=' MEDIUM' THEN DO;
NEWEXP=EXPANF*0.0412; MDLYR= ' 01' ; OUTPUT MI SSAGE;
NEWEXP=EXPANF*0.0447; MDLYR= ' 02' ; OUTPUT MI SSAGE;
NEWEXP=EXPANF*0.0670; MDLYR= ' 03' ; OUTPUT MI SSAGE;
NEWEXP=EXPANF*0.0476; MDLYR= ' 04' ; OUTPUT MI SSAGE;
NEWEXP=EXPANF*0.0376; MDLYR= ' 05' ; OUTPUT MI SSAGE;
NEWEXP=EXPANF*0.0303; MDLYR= ' 06' ; OUTPUT MI SSAGE;
NEWEXP=EXPANF*0.0385; MDLYR= ' 07' ; OUTPUT MI SSAGE;
NEWEXP=EXPANF*0.0493; MDLYR= ' 08' ; OUTPUT MI SSAGE;
NEWEXP=EXPANF*0.0525; MDLYR= ' 09' ; OUTPUT MI SSAGE;
NEWEXP=EXPANF*0.0510; MDLYR= ' 10' ; OUTPUT MI SSAGE;
NEWEXP=EXPANF*0.5403; MDLYR= ' 11' ; OUTPUT MI SSAGE;
END;
```



```

IF SIZE=' HEAVY' THEN DO;
  NEWEXP=EXPANF*0. 0779; MDLYR= ' 01' ; OUTPUT MI SSAGE;
  NEWEXP=EXPANF*0. 0768; MDLYR= ' 02' ; OUTPUT MI SSAGE;
  NEWEXP=EXPANF*0. 0894; MDLYR= ' 03' ; OUTPUT MI SSAGE;
  NEWEXP=EXPANF*0. 0680; MDLYR= ' 04' ; OUTPUT MI SSAGE;
  NEWEXP=EXPANF*0. 0565; MDLYR= ' 05' ; OUTPUT MI SSAGE;
  NEWEXP=EXPANF*0. 0414; MDLYR= ' 06' ; OUTPUT MI SSAGE;
  NEWEXP=EXPANF*0. 0380; MDLYR= ' 07' ; OUTPUT MI SSAGE;
  NEWEXP=EXPANF*0. 0473; MDLYR= ' 08' ; OUTPUT MI SSAGE;
  NEWEXP=EXPANF*0. 0502; MDLYR= ' 09' ; OUTPUT MI SSAGE;
  NEWEXP=EXPANF*0. 0486; MDLYR= ' 10' ; OUTPUT MI SSAGE;
  NEWEXP=EXPANF*0. 4059; MDLYR= ' 11' ; OUTPUT MI SSAGE;
END;

```

END;

```

*****;
** IMPUTE MISSING FLEET INDICATORS **;
*****;

```

```

DATA HAVEFLT MISSFLT(DROP=EXPANF RENAME=(NEWEXP=EXPANF)); SET
HAVEAGE MI SSAGE;

```

```

IF FLTSZE NE ' ' THEN OUTPUT HAVEFLT;
ELSE DO;

```

```

  IF OPCLAS=' 2' THEN DO;
    NEWEXP=EXPANF; FLTSZE=' 01' ; OUTPUT MI SSFLT;
  END;

```

```

  ELSE IF OPCLAS=' 4' THEN DO;
    NEWEXP=EXPANF; FLTSZE=' 04' ; OUTPUT MI SSFLT;
  END;

```

```

  ELSE IF OPCLAS=' 1' THEN DO;
    IF SIZE=' MEDIUM THEN DO;
      NEWEXP=EXPANF*0. 6226; FLTSZE=' 01' ; OUTPUT MI SSFLT;
      NEWEXP=EXPANF*0. 3774; FLTSZE=' 04' ; OUTPUT MI SSFLT;
    END;
  END;

```

```

END;
ELSE IF SIZE=' HEAVY' THEN DO;
    NEWEXP=EXPANF*0. 4769; FLTSZE=' 01' ; OUTPUT MISSFLT;
    NEWEXP=EXPANF*0. 5231; FLTSZE=' 04' ; OUTPUT MISSFLT;
END;
END;
ELSE IF OPCLAS=' 3' THEN DO;
    IF SIZE=' MEDIUM THEN DO;
        NEWEXP=EXPANF*0. 2185; FLTSZE=' 01' ; OUTPUT MISSFLT;
        NEWEXP=EXPANF*0. 7815; FLTSZE=' 04' ; OUTPUT MISSFLT;
    END;
    ELSE IF SIZE=' HEAVY' THEN DO;
        NEWEXP=EXPANF*0. 2930; FLTSZE=' 01' ; OUTPUT MISSFLT;
        NEWEXP=EXPANF*0. 7070; FLTSZE=' 04' ; OUTPUT MISSFLT;
    END;
END;
END;
ELSE IF OPCLAS=' 5' THEN DO;
    IF SIZE=' MEDIUM THEN DO;
        NEWEXP=EXPANF; FLTSZE=' 01' ; OUTPUT MISSFLT;
    END;
    ELSE IF SIZE=' HEAVY' THEN DO;
        NEWEXP=EXPANF*0. 9697; FLTSZE=' 01' ; OUTPUT MISSFLT;
        NEWEXP=EXPANF*0. 0303; FLTSZE=' 04' ; OUTPUT MISSFLT;
    END;
END;
END;
END;

*****;
** CLASSIFY TIUS PRNPRO INTO NEMS SECTORS **;
*****;

DATA KNOWSEC DKSEC(DROP=EXPANF RENAME=(NEWEXP=EXPANF));
    SET HAVEFLT MISSFLT;

IF SECTOR NE ' 99' THEN DO;
    OUTPUT KNOWSEC;
END;

```

```

ELSE DO;
  NEWEXP=EXPANF*0.0500; SECTOR = '01'; OUTPUT DKSEC;
  NEWEXP=EXPANF*0.0236; SECTOR = '02'; OUTPUT DKSEC;
  NEWEXP=EXPANF*0.1111; SECTOR = '03'; OUTPUT DKSEC;
  NEWEXP=EXPANF*0.0248; SECTOR = '04'; OUTPUT DKSEC;
  NEWEXP=EXPANF*0.0410; SECTOR = '05'; OUTPUT DKSEC;
  NEWEXP=EXPANF*0.1826; SECTOR = '06'; OUTPUT DKSEC;
  NEWEXP=EXPANF*0.1996; SECTOR = '07'; OUTPUT DKSEC;
  NEWEXP=EXPANF*0.1362; SECTOR = '08'; OUTPUT DKSEC;
  NEWEXP=EXPANF*0.2217; SECTOR = '09'; OUTPUT DKSEC;
  NEWEXP=EXPANF*0.0093; SECTOR = '10'; OUTPUT DKSEC;
END;

```

```

*****;
**SAVE PERMANENT DATASET WHICH NOW HAS NO MISSING FUEL TYPE OR**;
**FLEET INDICATOR AND HAS THE EIA NEMS SECTORS PROPERLY CODED **;
*****;
DATA D.EIAVIU97; SET KNOWSEC DKSEC;

```

```

*****;
** CHANGE ALL RECORDS WITH MAJOR USE = UTILITY **;
** TO THE UTILITY SECTOR **;
*****;

```

```

IF MAJUSE = '09' THEN SECTOR = '11';

```

```

RUN;

```

```

** TO CHECK THE TOTAL NUMBER OF TRUCKS **;
PROC TABULATE DATA=D.EIAVIU97 MISSING;
VAR EXPANF;
CLASS SIZE;
TABLES SIZE ALL, EXPANF*SUM*F=15.2;
TITLE '1997 VIUS';
TITLE2 'TOTAL TRUCKS (VIUS + GOVT) AFTER IMPUTATIONS';
RUN;

```

```

*****;
** NEMS FREIGHT MODEL PROGRAMMING **;
**          PROGRAM 3          **;
** OAK RIDGE NATIONAL LABORATORY **;
** JUNE 2000          STACY C DAVIS **;
*****;

```

```
LIBNAME D 'D:\TIUS\VIUS97\DATA' ;
```

```
OPTIONS LINESIZE=110 NONUMBER NODATE;
```

```

*****;
** FORMAT SECTION **;
*****;

```

```
PROC FORMAT;
```

```
VALUE $FUELTYP
```

```

' 1' = ' GASOLINE'
' 2' = ' GASOLINE'
' 3' = ' DIESEL'
' 4' = ' LPG'
' 5' = ' CNG'
;

```

```
VALUE $DIES
```

```

' 3' = ' DIESEL'
OTHER = ' NON- DIESEL'
;

```

```
VALUE $FLSTAT
```

```

' 01' = ' NON- FLEET'
' 02' = ' NON- FLEET'
' 03' = ' NON- FLEET'
' 04' = ' FLEET'
' 05' = ' FLEET'
' 06' = ' FLEET'
' 07' = ' FLEET'
' 08' = ' FLEET'

```

' 09' = ' FLEET'
' 10' = ' FLEET'
;

VALUE \$USE

' 01' = ' CHEMICALS, RUBBER, PLASTIC'
' 02' = ' PRIMARY METALS'
' 03' = ' PROCESSED FOODS'
' 04' = ' PAPER PRODUCTS'
' 05' = ' PETROLEUM PRODUCTS'
' 06' = ' STONE, CLAY, GLASS, CONCRETE'
' 07' = ' METAL DURABLE'
' 08' = ' OTHER MANUFACTURING'
' 09' = ' AGRICULTURE'
' 10' = ' MINING'
' 11' = ' UTILITY'
' 12' = ' GOVERNMENT'
;

VALUE \$AGE

' 01' = ' NEW
' 02' = ' 1 YR OLD'
' 03' = ' 2 YR OLD'
' 04' = ' 3 YR OLD'
' 05' = ' 4 YR OLD'
' 06' = ' 5 YR OLD'
' 07' = ' 6 YR OLD'
' 08' = ' 7 YR OLD'
' 09' = ' 8 YR OLD'
' 10' = ' 9 YR OLD'
' 11' = ' 10 + YR OLD'
;

TITLE ' VIUS 1997' ;

DATA EIAVIU97; SET D. EIAVIU97;

FLT=PUT(FLTSIZE, \$FLSTAT.);

IF ENGTYP = ' 1' THEN ENGTYP = ' 2' ;

PROC SORT DATA=EIAVIU97; BY FLT SIZE ENGTYP;

** TABLE 1 **;

PROC TABULATE DATA=EIAVIU97 MISSING NOSEPS
FORMCHAR=' 0900000000090009000000' X;
WHERE MDLYR=' 01' ;
CLASS ENGTYP SIZE;
FORMAT ENGTYP \$FUELTYP. ;
VAR EXPANF;
BY FLT;
LABEL FLT=' FLEET INDICATOR' ;
TABLES (ENGTYP=' FUEL TYPE' ALL=' TOTAL'), (SIZE=' ' ALL=' TOTAL') *EXPANF=' TRUCKS' *SUM=' ' *F=COMMA10. ;
TITLE2 'NUMBER OF TRUCKS BY FUEL TYPE, SIZE, AND FLEET STATUS' ;
RUN;

** TABLE 2**;

PROC TABULATE DATA=EIAVIU97 MISSING NOSEPS
FORMCHAR=' 0900000000090009000000' X;
WHERE MDLYR=' 01' ;
CLASS SECTOR SIZE ENGTYP;
FORMAT SECTOR \$USE. ENGTYP \$DIES. ;
VAR EXPANF;
BY FLT;
LABEL FLT=' FLEET INDICATOR' ;
TABLES SECTOR ALL=' TOTAL' , SIZE=' ' *(ENGTYP ALL=' TOTAL') *EXPANF=' TRUCKS' *SUM=' ' *F=COMMA10. ;
TITLE2 'NUMBER OF NEW TRUCKS BY SECTOR, SIZE, AND FLEET STATUS' ;
RUN;

** TABLE 3 **;

PROC TABULATE DATA=EIAVIU97 MISSING NOSEPS
FORMCHAR=' 0900000000090009000000' X;
WHERE MDLYR=' 01' ;
CLASS SECTOR SIZE ENGTYP;
FORMAT ENGTYP \$FUELTYP. SECTOR \$USE. ;
VAR EXPANF;

```

BY FLT SIZE;
LABEL FLT=' FLEET INDICATOR' ;
TABLES SECTOR ALL=' TOTAL' , (ENGTYP=' ') *EXPANF=' TRUCKS' *SUM=' '
    *F=COMMA10. ;
TITLE2 'NUMBER OF NEW TRUCKS BY SECTOR, SIZE, FUEL TYPE AND FLEET
    STATUS' ;
RUN;

```

```

** SORT FOR TABLE 5** ;
PROC SORT DATA=EIAVIU97 OUT=EIAVIU;
    BY FLT SIZE;

```

```

** TABLE 4 ** ;
PROC TABULATE DATA=EIAVIU97 MISSING NOSEPS
FORMCHAR=' 0900000000090009000000' X;
CLASS SECTOR ENGTYP MDLYR;
FORMAT SECTOR $USE. ENGTYP $FUELTP. MDLYR $AGE. ;
VAR EXPANF;
BY FLT SIZE ENGTYP;
LABEL FLT=' FLEET INDICATOR' ;
TABLES MDLYR, SECTOR*EXPANF=' TRUCKS' *SUM=' ' *F=COMMA10. ;
TITLE2 'NUMBER OF TRUCKS BY FLEET INDICATOR, SIZE, FUEL TYPE,
    SECTOR, AND AGE' ;
RUN;

```

```

** TABLE 5 ** ;
PROC TABULATE DATA=EIAVIU MISSING NOSEPS
FORMCHAR=' 0900000000090009000000' X;
CLASS SECTOR MDLYR;
FORMAT SECTOR $USE. ENGTYP $FUELTP. MDLYR $AGE. ;
VAR EXPANF;
BY FLT SIZE;
LABEL FLT=' FLEET INDICATOR' ;
TABLES MDLYR, SECTOR*EXPANF=' TRUCKS' *SUM=' ' *F=COMMA10. ;
TITLE2 'NUMBER OF TRUCKS BY FLEET INDICATOR, SIZE, SECTOR,
    AND AGE' ;
TITLE3 'FOR FLEET SHARE OF TRUCK PURCHASES' ;
RUN;

```

```
** SORT FOR TABLE 6 **;  
PROC SORT DATA=EIAVIU97(KEEP=EXPANF ANNML SIZE ENGTYP SECTOR  
MDLYR) OUT=EIAVIU;  
BY SIZE ENGTYP;
```

```
** TABLE 6 **;  
PROC TABULATE DATA=D. EIAVIU97 MISSING NOSEPS  
FORMCHAR=' 0900000000090009000000' X;  
CLASS SECTOR SIZE;  
VAR ANNML;  
WEIGHT EXPANF;  
TABLES SECTOR ALL='TOTAL' , SIZE=' ' *ANNML='TOTAL VM' *  
SUM=' ' *F=COMMA15. ;  
TITLE2 'AVERAGE ANNUAL VMF PER TRUCK BY SECTOR & SIZE' ;  
RUN;
```

```
** TABLE 7 **;  
PROC TABULATE DATA=EIAVIU97 MISSING NOSEPS  
FORMCHAR=' 0900000000090009000000' X;  
CLASS SECTOR;  
FORMAT SECTOR $USE. ;  
VAR ANNML;  
WEIGHT EXPANF;  
TABLES SECTOR ALL='TOTAL' , ANNML='TOTAL VM' *SUM=' ' *F=COMMA18. ;  
TITLE2 'TOTAL VMF FOR 1997 BY SECTOR' ;  
RUN;
```

```
** TABLES 8 AND 9 **;  
PROC TABULATE DATA=EIAVIU97 MISSING NOSEPS  
FORMCHAR=' 0900000000090009000000' X;  
WHERE MDLYR=' 01' ;  
CLASS SECTOR SIZE;  
FORMAT SECTOR $USE. ;  
VAR EXPANF;  
BY FLT;  
TABLES SECTOR ALL='TOTAL' , (SIZE ALL='TOTAL' )  
*EXPANF='TRUCKS' *SUM=' ' *F=COMMA10. ;  
TITLE2 'NEW TRUCKS BY FLEET INDICATOR, SECTOR, AND SIZE' ;
```



```

RUN;

** PREPARE DATA FOR TABLE 11 **;
DATA EIAVIU; SET EIAVIU97(KEEP=MDLYR SIZE ENGTYP MPG EXPANF);
  IF SIZE = 'MEDIUM' AND MPG GT 13 THEN DELETE;
  IF SIZE = 'HEAVY' AND MPG GT 11 THEN DELETE;

** SORT FOR TABLE 11 **;
PROC SORT DATA=EIAVIU;
  BY SIZE;

** TABLE 11 **;
PROC TABULATE DATA=EIAVIU MISSING NOSEPS
FORMCHAR=' 0900000000090009000000' X;
CLASS MDLYR SIZE ENGTYP;
FORMAT MDLYR $AGE. ENGTYP $FUEL TYP. ;
VAR MPG;
WEIGHT EXPANF;
BY SIZE;
TABLES MDLYR=' AGE' ALL=' TOTAL' , ENGTYP=' FUEL TYPE'
  *MPG*MEAN=' AVERAGE' *F=10. 5;
TITLE2 ' FUEL ECONOMY BY SIZE, FUEL TYPE AND AGE' ;
RUN;

```

```

*****;
** NEMS FREIGHT MODEL PROGRAMMING **;
**          PROGRAM 4          **;
** OAK RIDGE NATIONAL LABORATORY **;
** JUNE 2000          STACY C DAVIS **;
*****;

```

```
LIBNAME D 'D:\TIUS\VIUS97\DATA';
```

```
OPTIONS LINESIZE=110;
```

```

*****;
** FORMAT SECTION **;
*****;

```

```
PROC FORMAT;
```

```
VALUE $FUELTYP
```

```
' 1' = ' GASOLINE'
```

```
' 2' = ' GASOLINE'
```

```
' 3' = ' DIESEL'
```

```
' 4' = ' LPG'
```

```
' 5' = ' CNG'
```

```
;
```

```
VALUE $DIES
```

```
' 3' = ' DIESEL'
```

```
OTHER = ' NON-DIESEL'
```

```
;
```

```
VALUE $FLSTAT
```

```
' 01' = ' NON-FLEET'
```

```
' 02' = ' NON-FLEET'
```

```
' 03' = ' NON-FLEET'
```

```
' 04' = ' FLEET'
```

```
' 05' = ' FLEET'
```

```
' 06' = ' FLEET'
```

```
' 07' = ' FLEET'
```

```
' 08' = ' FLEET'
```

' 09' = ' FLEET'
' 10' = ' FLEET'
;

VALUE \$USE

' 01' = ' CHEMICALS, RUBBER, PLASTIC'
' 02' = ' PRIMARY METALS'
' 03' = ' PROCESSED FOODS'
' 04' = ' PAPER PRODUCTS'
' 05' = ' PETROLEUM PRODUCTS'
' 06' = ' STONE, CLAY, GLASS, CONCRETE'
' 07' = ' METAL DURABLE'
' 08' = ' OTHER MANUFACTURING'
' 09' = ' AGRICULTURE'
' 10' = ' MINING'
' 11' = ' UTILITY'
' 12' = ' GOVERNMENT'
;

VALUE \$AGE

' 01' = ' NEW
' 02' = ' 1 YR OLD'
' 03' = ' 2 YR OLD'
' 04' = ' 3 YR OLD'
' 05' = ' 4 YR OLD'
' 06' = ' 5 YR OLD'
' 07' = ' 6 YR OLD'
' 08' = ' 7 YR OLD'
' 09' = ' 8 YR OLD'
' 10' = ' 9 YR OLD'
' 11' = ' 10 + YR OLD'
;

TITLE ' VIUS 1997' ;

DATA EIAVIU97; SET D. EIAVIU97;

FLT=PUT(FLTSIZE, \$FLSTAT.);

IF ENGTYP = ' 1' THEN ENGTYP = ' 2' ;


```
TITLE2 'NUMBER OF NEW TRUCKS BY SECTOR, SIZE, FUEL TYPE AND FLEET
STATUS' ;
RUN;
```

```
** TABLE 4 **;
PROC TABULATE DATA=EIAVIU97 MISSING NOSEPS
FORMCHAR=' 0900000000090009000000' X;
CLASS SECTOR ENGTYP MDLYR;
FORMAT SECTOR $USE. ENGTYP $FUELTP. MDLYR $AGE. ;
VAR EXPANF;
BY FLT SIZE ENGTYP;
LABEL FLT=' FLEET INDICATOR' ;
TABLES MDLYR, SECTOR*EXPANF=' TRUCKS' *N*F=COMMA10. ;
TITLE2 'NUMBER OF TRUCKS BY FLEET INDICATOR, SIZE, FUEL TYPE,
SECTOR, AND AGE' ;
RUN;
```

```
** SORT FOR TABLE 5**;
PROC SORT DATA=EIAVIU97 OUT=EIAVIU;
    BY FLT SIZE;
** TABLE 5 **;
PROC TABULATE DATA=EIAVIU MISSING NOSEPS
FORMCHAR=' 0900000000090009000000' X;
CLASS SECTOR MDLYR;
FORMAT SECTOR $USE. ENGTYP $FUELTP. MDLYR $AGE. ;
VAR EXPANF;
BY FLT SIZE;
LABEL FLT=' FLEET INDICATOR' ;
TABLES MDLYR, SECTOR*EXPANF=' TRUCKS' *N*F=COMMA10. ;
TITLE2 'NUMBER OF TRUCKS BY FLEET INDICATOR, SIZE, SECTOR,
    AND AGE' ;
TITLE3 'FOR FLEET SHARE OF TRUCK PURCHASES' ;
RUN;
```

```
** SORT FOR TABLE 5 **;
PROC SORT DATA=EIAVIU97(KEEP=EXPANF FLT SIZE MDLYR) OUT=EIAVIU;
    BY SIZE;
** TABLE 5 **;
```

```

PROC TABULATE DATA=EIAVIU MISSING;
CLASS FLT MDLYR;
FORMAT MDLYR $AGE. ;
VAR EXPANF;
BY SIZE;
TABLES (MDLYR=' AGE' ALL=' TOTAL' ), (FLT
ALL=' TOTAL' ) *EXPANF=' TRUCKS' *N*F=COMMA10. ;
LABEL FLT=' FLEET INDICATOR' ;
TITLE2 ' TRUCKS BY FLEET INDICATOR AND SIZE CLASS' ;
RUN;

** SORT FOR TABLE 6 **;
PROC SORT DATA=EIAVIU97(KEEP=EXPANF ANNML SIZE ENGTYP SECTOR
MDLYR) OUT=EIAVIU;
BY SIZE ENGTYP;
** TABLE 6 **;
PROC TABULATE DATA=D. EIAVIU97 MISSING NOSEPS
FORMCHAR=' 0900000000090009000000' X;
CLASS SECTOR SIZE;
VAR ANNML;
WEIGHT EXPANF;
TABLES SECTOR ALL=' TOTAL' , SIZE=' ' *ANNML=' TOTAL VMT' *
N*F=COMMA15. ;
TITLE2 ' AVERAGE ANNUAL VMT PER TRUCK BY SECTOR & SIZE' ;
RUN;

** TABLE 7 **;
PROC TABULATE DATA=EIAVIU97 MISSING;
CLASS SECTOR;
FORMAT SECTOR $USE. ;
VAR ANNML;
WEIGHT EXPANF;
TABLES SECTOR ALL=' TOTAL' , ANNML=' TOTAL VMT' *N*F=COMMA18. ;
TITLE2 ' TOTAL VMT FOR 1997 BY SECTOR' ;
RUN;

** TABLES 8 AND 9 **;
PROC TABULATE DATA=EIAVIU97 MISSING;

```

```

WHERE MDLYR=' 01' ;
CLASS SECTOR SIZE;
FORMAT SECTOR $USE. ;
VAR EXPANF;
BY FLT;
TABLES SECTOR ALL=' TOTAL' , (SIZE
ALL=' TOTAL' ) *EXPANF=' TRUCKS' *N*F=COMMA10. ;
TITLE2 'NEW TRUCKS BY FLEET INDICATOR, SECTOR, AND SIZE' ;
RUN;

** PREPARE DATA FOR TABLE 11 **;
DATA EIAVIU; SET EIAVIU97(KEEP=MDLYR SIZE ENGTYP MPG EXPANF);
  IF SIZE = 'MEDIUM' AND MPG GT 13 THEN DELETE;
  IF SIZE = 'HEAVY' AND MPG GT 11 THEN DELETE;

** SORT FOR TABLE 11 **;
PROC SORT DATA=EIAVIU;
  BY SIZE;

** TABLE 11 **;
PROC TABULATE DATA=EIAVIU MISSING NOSEPS
FORMCHAR=' 0900000000090009000000' X;
CLASS MDLYR SIZE ENGTYP;
FORMAT MDLYR $AGE. ENGTYP $FUELTYP. ;
VAR MPG;
WEIGHT EXPANF;
BY SIZE;
TABLES MDLYR=' AGE' ALL=' TOTAL' , ENGTYP=' FUEL TYPE' *MPG*N*F=10. 5;
TITLE2 'FUEL ECONOMY BY SIZE, FUEL TYPE AND AGE' ;
RUN;

```

APPENDIX C
HARDCOPY OF SPREADSHEET DELIVERED TO EIA

VIUS 1997

NUMBER OF NEW TRUCKS BY FUEL TYPE, SIZE, AND FLEET STATUS

FUEL TYPE	FLEET INDICATOR=FLEET			FLEET INDICATOR=NON-FLEET		
	HEAVY TRUCKS	MEDIUM TRUCKS	TOTAL TRUCKS	HEAVY TRUCKS	MEDIUM TRUCKS	TOTAL TRUCKS
GASOLINE	1,731	21,914	23,645	2,940	20,268	23,208
DIESEL	152,101	54,352	206,454	36,917	26,973	63,890
LPG	5	680	685	0	295	295
CNG	4	413	416	48	1	49
TOTAL	153,842	77,359	231,201	39,905	47,538	87,443

VIUS 1997

NUMBER OF NEW TRUCKS BY SECTOR, SIZE, AND FLEET STATUS

FLEET INDICATOR=FLEET		SIZE=HEAVY			SIZE=MEDIUM		
SECTOR	SECTOR #	DIESEL	TOTAL	% DIESEL	DIESEL	TOTAL	% DIESEL
CHEMICALS,RUBBER,PLASTIC	01	9,375	9,395	99.79%	2,932	3,251	90.19%
PRIMARY METALS	02	4,813	4,821	99.83%	471	566	83.22%
PROCESSED FOODS	03	33,865	33,959	99.72%	10,081	11,286	89.32%
PAPER PRODUCTS	04	7,653	7,661	99.90%	4,264	5,440	78.38%
PETROLEUM PRODUCTS	05	4,714	4,729	99.68%	1,350	2,252	59.95%
STONE,CLAY,GLASS,CONCRETE	06	21,480	21,543	99.71%	4,826	7,102	67.95%
METAL DURABLE	07	17,775	18,102	98.19%	7,411	10,399	71.27%
OTHER MANUFACTURING	08	27,162	27,693	98.08%	9,962	14,312	69.61%
AGRICULTURE	09	17,394	17,500	99.39%	3,798	5,236	72.54%
MINING	10	2,449	2,453	99.84%	102	140	72.86%
UTILITY	11	569	606	93.89%	4,713	6,624	71.15%
GOVERNMENT	12	4,851	5,380	90.17%	4,443	10,750	41.33%
TOTAL		152,101	153,842	98.87%	54,352	77,359	70.26%

FLEET INDICATOR=NON-FLEET		SIZE=HEAVY			SIZE=MEDIUM		
SECTOR	SECTOR #	DIESEL	TOTAL	% DIESEL	DIESEL	TOTAL	% DIESEL
CHEMICALS,RUBBER,PLASTIC	01	1,395	1,512	92.26%	2,430	2,858	85.02%
PRIMARY METALS	02	1,079	1,112	97.03%	451	541	83.36%
PROCESSED FOODS	03	4,725	5,322	88.78%	1,597	3,431	46.55%
PAPER PRODUCTS	04	1,458	1,494	97.59%	1,015	1,471	69.00%
PETROLEUM PRODUCTS	05	1,536	1,593	96.42%	689	1,076	64.03%
STONE,CLAY,GLASS,CONCRETE	06	7,977	8,429	94.64%	4,424	7,886	56.10%
METAL DURABLE	07	4,944	5,870	84.22%	9,201	14,444	63.70%
OTHER MANUFACTURING	08	4,588	4,967	92.37%	3,996	9,627	41.51%
AGRICULTURE	09	8,142	8,521	95.55%	2,062	4,505	45.77%
MINING	10	900	913	98.58%	218	254	85.83%
UTILITY	11	172	172	100.00%	891	1,445	61.66%
GOVERNMENT	12						
TOTAL		36,917	39,905	92.51%	26,973	47,538	56.74%

VIUS 1997

NUMBER OF NEW TRUCKS BY SECTOR, SIZE, FUEL TYPE AND FLEET STATUS

FLEET INDICATOR=FLEET, SIZE=HEAVY

FLEET INDICATOR=FLEET, SIZE=MEDIUM

SECTOR	SECTOR #	GASOLINE	DIESEL	LPG	CNG	GASOLINE	DIESEL	LPG	CNG
CHEMICALS,RUBBER,PLASTIC	01	19	9,375			317	2,932		
PRIMARY METALS	02	8	4,813			96	471		
PROCESSED FOODS	03	94	33,865			1,059	10,081		
PAPER PRODUCTS	04	9	7,653			848	4,264		
PETROLEUM PRODUCTS	05	14	4,714			539	1,350	363	
STONE,CLAY,GLASS,CONCRETE	06	64	21,480			2,275	4,826		
METAL DURABLE	07	327	17,775			2,986	7,411		
OTHER MANUFACTURING	08	531	27,162			4,350	9,962		
AGRICULTURE	09	106	17,394			1,438	3,798		
MINING	10	3	2,449			38	102		
UTILITY	11		569			1,850	4,713		
GOVERNMENT	12	520	4,851			6,118	4,443		

FLEET INDICATOR=NON-FLEET, SIZE=HEAVY

FLEET INDICATOR=NON-FLEET, SIZE=MEDIUM

SECTOR	SECTOR #	GASOLINE	DIESEL	LPG	CNG	GASOLINE	DIESEL	LPG	CNG
CHEMICALS,RUBBER,PLASTIC	01	116	1,395			425	2,430		
PRIMARY METALS	02	33	1,079			90	451		
PROCESSED FOODS	03	596	4,725			1,772	1,597		
PAPER PRODUCTS	04	36	1,458			456	1,015		
PETROLEUM PRODUCTS	05	57	1,536			162	689	225	
STONE,CLAY,GLASS,CONCRETE	06	451	7,977			3,459	4,424		
METAL DURABLE	07	925	4,944			5,240	9,201		
OTHER MANUFACTURING	08	378	4,588			5,631	3,996		
AGRICULTURE	09	333	8,142			2,442	2,062		
MINING	10	13	900			35	218		
UTILITY	11		172			554	891		
GOVERNMENT	12								

Because we got so little alternative fuel data in the original breakouts, here are some other data that might be of help:

NUMBER OF TRUCKS BY SIZE, SECTOR AND FUEL TYPE

SECTOR	SECTOR #	SIZE=MEDIUM				SIZE=HEAVY			
		GASOLINE	DIESEL	LPG	CNG	GASOLINE	DIESEL	LPG	CNG
CHEMICALS,RUBBER,PLASTIC	01	742	5,362	4	1	136	10,771		
PRIMARY METALS	02	186	922			41	5,892		
PROCESSED FOODS	03	2,831	11,678	208		690	38,590		
PAPER PRODUCTS	04	1,304	5,279		328	45	9,110		
PETROLEUM PRODUCTS	05	702	2,039	588		71	6,250		
STONE,CLAY,GLASS,CONCRETE	06	5,735	9,250	3		515	29,457		
METAL DURABLE	07	8,227	16,611	3		1,252	22,719		
OTHER MANUFACTURING	08	9,981	13,958			909	31,750		
AGRICULTURE	09	3,880	5,860			440	25,536		
MINING	10	73	321			16	3,350		
UTILITY	11	2,404	5,603				742		
GOVERNMENT	12	6,118	4,443	167		520	4,851		

NUMBER OF TRUCKS BY SIZE, FLEET INDICATOR AND FUEL TYPE

	SIZE=MEDIUM				SIZE=HEAVY			
	GASOLINE	DIESEL	LPG	CNG	GASOLINE	DIESEL	LPG	CNG
FLEET	21,914	54,352	680	413	1,731	152,101	5	4
NON-FLEET	20,268	26,973	295	1	2,940	36,917	0	48
TOTAL	42,182	81,325	976	414	4,671	189,018	5	52

VIUS 1997
 NUMBER OF TRUCKS BY FLEET INDICATOR, SIZE, FUEL TYPE, SECTOR, AND AGE

FLEET INDICATOR=FLEET, SIZE=HEAVY, ENGTYP=GASOLINE

AGE	SECTOR #												
	1	2	3	4	5	6	7	8	9	10	11	12	
NEW	19		94					327	531	106			520
1 YR OLD			59			106	535				199		513
2 YR OLD	111	14	361	57	24	128	673	234	131	5			597
3 YR OLD	392		130	31	18	68	315	71	128				454
4 YR OLD			368										377
5 YR OLD													276
6 YR OLD											41		254
7 YR OLD							27	55					316
8 YR OLD			75			252	358	171					335
9 YR OLD													325
10 + YR OLD	1,610	186	1,243	311	1,255	4,326	3,655	1,416	6,869	188	808		2,711

FLEET INDICATOR=FLEET, SIZE= HEAVY, ENGTYP=DIESEL

AGE	SECTOR #												
	1	2	3	4	5	6	7	8	9	10	11	12	
NEW	9,375	4,813	33,865	7,653	4,714	21,480	17,775	27,162	17,394	2,449	569		4,851
1 YR OLD	8,782	5,173	29,462	8,223	4,530	21,184	19,499	27,402	17,479	1,916	1,110		4,782
2 YR OLD	10,255	5,419	32,070	10,602	6,370	25,370	20,637	27,037	21,945	1,689	1,647		5,567
3 YR OLD	8,226	4,790	23,089	6,182	4,817	19,133	17,447	19,962	14,379	1,419	911		4,234
4 YR OLD	7,889	3,908	18,889	5,035	3,479	14,160	11,837	14,341	12,330	1,060	972		3,518
5 YR OLD	4,414	1,722	14,956	2,330	2,345	8,164	8,992	8,221	8,644	885	852		2,578
6 YR OLD	4,430	1,800	13,000	2,304	3,733	9,683	7,233	7,226	8,011	1,059	908		2,366
7 YR OLD	4,442	1,875	11,086	2,197	2,946	12,592	10,153	9,978	8,029	922	722		2,945
8 YR OLD	2,972	3,252	8,318	2,216	3,132	15,053	9,806	8,000	9,296	642	1,011		3,126
9 YR OLD	3,681	1,994	7,952	1,800	2,833	15,629	8,360	8,318	8,716	797	1,496		3,026
10 + YR OLD	18,143	8,042	27,535	7,106	18,022	112,051	59,993	31,588	56,954	7,693	6,576		25,275

NUMBER OF TRUCKS BY FLEET INDICATOR, SIZE, FUEL TYPE, SECTOR, AND AGE (CONTINUED)

2

FLEET INDICATOR=FLEET, SIZE= HEAVY, ENGTYP=LPG												
AGE	SECTOR #											
	1	2	3	4	5	6	7	8	9	10	11	12
NEW												
1 YR OLD												
2 YR OLD												
3 YR OLD												
4 YR OLD												
5 YR OLD												
6 YR OLD												
7 YR OLD												
8 YR OLD												
9 YR OLD												
10 + YR OLD	11	5	25	6	176	47	46	31	84	2	25	28

FLEET INDICATOR=FLEET, SIZE= HEAVY, ENGTYP=CNG												
AGE	SECTOR #											
	1	2	3	4	5	6	7	8	9	10	11	12
NEW												
1 YR OLD												
2 YR OLD												
3 YR OLD												
4 YR OLD												
5 YR OLD												
6 YR OLD												
7 YR OLD												
8 YR OLD												
9 YR OLD												
10 + YR OLD						1	13		1			20

NUMBER OF TRUCKS BY FLEET INDICATOR, SIZE, FUEL TYPE, SECTOR, AND AGE (CONTINUED)

3

FLEET INDICATOR=FLEET, SIZE=MEDIUM, ENGTYP=GASOLINE

SECTOR #												
AGE	1	2	3	4	5	6	7	8	9	10	11	12
NEW	317	96	1,059	848	539	2,275	2,986	4,350	1,438	38	1,850	6,118
1 YR OLD	155	300	3,003	505	127	2,599	3,588	1,717	1,391	29	3,094	6,637
2 YR OLD	2,042	267	1,379	432	503	3,392	4,688	6,939	1,104	39	3,309	9,948
3 YR OLD	412	158	2,592	524	618	1,828	4,278	4,947	1,811	62	2,503	7,068
4 YR OLD	932	207	937	146	530	2,285	3,291	3,807	819	19	2,540	5,583
5 YR OLD	586	72	1,430	76	126	949	4,847	2,880	739	29	2,790	4,499
6 YR OLD	634	73	1,468	472	1,016	3,519	2,740	2,756	1,645	29	2,880	5,717
7 YR OLD	1,019	539	1,735	572	907	2,607	7,987	6,013	1,273	37	3,164	7,320
8 YR OLD	2,893	84	1,527	174	351	3,813	5,542	6,354	2,796	22	6,087	7,795
9 YR OLD	1,094	694	2,238	513	833	2,061	3,258	6,257	3,009	59	6,091	7,573
10 + YR OLD	13,042	3,398	23,235	3,641	11,723	44,501	46,729	30,250	48,317	1,437	18,645	80,226

FLEET INDICATOR=FLEET, SIZE=MEDIUM, ENGTYP=DIESEL

SECTOR #												
AGE	1	2	3	4	5	6	7	8	9	10	11	12
NEW	2,932	471	10,081	4,264	1,350	4,826	7,411	9,962	3,798	102	4,713	4,443
1 YR OLD	2,344	913	7,595	2,434	1,679	2,842	13,859	8,886	4,610	191	5,203	4,820
2 YR OLD	4,934	1,031	17,658	2,287	2,251	7,937	18,226	20,522	6,303	201	10,125	7,225
3 YR OLD	2,991	578	9,428	1,304	2,088	6,182	9,060	11,718	5,397	128	3,492	5,133
4 YR OLD	1,618	837	6,800	1,474	1,528	3,436	8,158	11,581	3,025	165	3,685	4,055
5 YR OLD	2,255	230	6,487	1,497	725	927	3,745	6,040	3,448	102	4,895	3,267
6 YR OLD	2,220	145	7,209	722	1,335	3,027	5,105	6,298	4,267	57	8,230	4,152
7 YR OLD	3,619	2,015	5,872	380	2,218	6,800	9,730	14,783	3,701	106	5,614	5,316
8 YR OLD	3,510	1,191	5,084	380	1,053	3,327	5,327	15,174	2,643	56	5,017	5,661
9 YR OLD	3,730	87	11,175	477	1,661	2,703	4,316	7,406	3,332	246	2,771	5,500
10 + YR OLD	8,149	2,439	30,893	2,095	10,128	20,490	28,401	16,827	22,635	398	16,653	58,263

NUMBER OF TRUCKS BY FLEET INDICATOR, SIZE, FUEL TYPE, SECTOR, AND AGE (CONTINUED)

4

FLEET INDICATOR=FLEET, SIZE=MEDIUM, ENGTYP=LPG

SECTOR #													
AGE	1	2	3	4	5	6	7	8	9	10	11	12	
NEW					363								167
1 YR OLD					461	3	5						181
2 YR OLD	474		134		744	29	81	21	34				271
3 YR OLD	10	4	60	4	1,006	4	3	9	2		1		193
4 YR OLD	1		929		695	6	7	5	4				152
5 YR OLD	3		366		1,506	86	42	29	48				123
6 YR OLD													156
7 YR OLD													199
8 YR OLD					818				330				212
9 YR OLD					809		7						206
10 + YR OLD	1,322	279	537	253	1,450	549	2,913	1,684	1,906	25	558		2,185

FLEET INDICATOR=FLEET, SIZE=MEDIUM, ENGTYP=CNG

SECTOR #													
AGE	1	2	3	4	5	6	7	8	9	10	11	12	
NEW													23
1 YR OLD													24
2 YR OLD			1				1						37
3 YR OLD	1		1			1	1	1	1				26
4 YR OLD						1		1					21
5 YR OLD						1	1	1	1				17
6 YR OLD													21
7 YR OLD													27
8 YR OLD													29
9 YR OLD							1						28
10 + YR OLD	21	10	47	10	18	81	219	303	258	417			296

NUMBER OF TRUCKS BY FLEET INDICATOR, SIZE, FUEL TYPE, SECTOR, AND AGE (CONTINUED)

5

FLEET INDICATOR=NON-FLEET, SIZE= HEAVY, ENGTYP=GASOLINE

AGE	SECTOR #											
	1	2	3	4	5	6	7	8	9	10	11	12
NEW	116	33	596	36	57	451	925	378	333	13		
1 YR OLD	128	169	366	141	53	377	615	571	376	12		
2 YR OLD	327	41	543	153	71	442	1,444	785	387	16		
3 YR OLD	623	22	503	120	98	456	570	689	424	9		
4 YR OLD	169	39	284	90	68	399	631	321	479	65		
5 YR OLD	61	105	193	30	50	292	340	657	458	11		
6 YR OLD	71	33	402	35	58	435	497	340	321	30		
7 YR OLD	61	29	309	30	50	250	461	189	315	11		
8 YR OLD	110	38	439	39	107	306	522	322	358	16		
9 YR OLD	73	34	202	36	273	453	625	253	737	13		
10 + YR OLD	7,080	2,787	12,504	2,752	6,207	31,058	28,682	16,957	65,971	1,587	256	

FLEET INDICATOR=NON-FLEET, SIZE=HEAVY, ENGTYP=DIESEL

AGE	SECTOR #											
	1	2	3	4	5	6	7	8	9	10	11	12
NEW	1,395	1,079	4,725	1,458	1,536	7,977	4,944	4,588	8,142	900	172	
1 YR OLD	1,726	1,198	4,936	1,690	1,871	7,335	5,511	3,694	8,240	410		
2 YR OLD	2,806	1,649	6,424	1,982	1,884	7,662	8,436	6,695	8,585	572		
3 YR OLD	1,971	1,394	4,379	929	1,257	6,881	7,064	6,502	8,189	700	117	
4 YR OLD	2,604	1,648	4,256	1,602	1,139	5,625	7,170	6,702	7,652	787		
5 YR OLD	2,405	992	4,842	1,773	1,225	4,809	5,938	5,759	7,285	499	102	
6 YR OLD	1,612	1,249	3,530	1,201	887	4,446	4,578	4,824	6,854	475	245	
7 YR OLD	1,494	2,082	4,839	2,208	1,028	9,304	8,020	7,337	10,054	683	236	
8 YR OLD	2,482	2,394	4,530	1,823	1,982	11,274	9,227	6,249	13,697	798		
9 YR OLD	2,170	1,310	5,287	1,191	1,733	11,504	8,396	6,711	13,465	850	190	
10 + YR OLD	14,109	10,528	20,755	5,127	12,127	124,413	65,951	34,080	132,060	6,672	1,521	

NUMBER OF TRUCKS BY FLEET INDICATOR, SIZE, FUEL TYPE, SECTOR, AND AGE (CONTINUED)

6

FLEET INDICATOR=NON-FLEET, SIZE=HEAVY, ENGTYP=LPG												
	SECTOR #											
AGE	1	2	3	4	5	6	7	8	9	10	11	12
NEW												
1 YR OLD												
2 YR OLD												
3 YR OLD												
4 YR OLD												
5 YR OLD												
6 YR OLD												
7 YR OLD												
8 YR OLD												
9 YR OLD												
10 + YR OLD	292	9	43	9	61	315	77	52	367	4	104	

FLEET INDICATOR=NON-FLEET, SIZE=HEAVY, ENGTYP=CNG												
	SECTOR #											
AGE	1	2	3	4	5	6	7	8	9	10	11	12
NEW												
1 YR OLD								10	7	13		
2 YR OLD												
3 YR OLD												
4 YR OLD												
5 YR OLD												
6 YR OLD												
7 YR OLD												
8 YR OLD						16						
9 YR OLD												
10 + YR OLD	23	8	39	9	14	132	115	47	719	3		

NUMBER OF TRUCKS BY FLEET INDICATOR, SIZE, FUEL TYPE, SECTOR, AND AGE (CONTINUED)

7

FLEET INDICATOR=NON-FLEET, SIZE=MEDIUM, ENGTYP=GASOLINE

SECTOR #												
AGE	1	2	3	4	5	6	7	8	9	10	11	12
NEW	425	90	1,772	456	162	3,459	5,240	5,631	2,442	35	554	
1 YR OLD	1,069	197	947	515	272	4,193	5,012	3,569	2,445	62	1,038	
2 YR OLD	427	1,019	3,849	532	365	4,226	7,862	6,783	3,466	169	364	
3 YR OLD	496	380	1,365	242	527	4,118	8,776	6,350	3,229	35	319	
4 YR OLD	467	575	1,316	463	267	1,709	6,929	5,765	1,147	33	435	
5 YR OLD	680	687	1,388	58	543	2,415	3,035	2,878	2,431	134	267	
6 YR OLD	1,063	376	786	281	1,302	2,084	6,323	1,678	4,941	46	1,437	
7 YR OLD	597	1,717	2,113	160	534	3,489	6,951	5,073	2,395	145	714	
8 YR OLD	1,209	837	4,063	729	710	5,991	12,509	7,641	5,680	258	1,193	
9 YR OLD	2,686	843	4,636	420	2,388	7,766	11,282	5,777	7,501	82	514	
10 + YR OLD	26,955	13,299	38,155	6,005	24,148	152,393	142,779	68,048	384,861	4,462	7,059	

FLEET INDICATOR=NON-FLEET, SIZE=MEDIUM, ENGTYP=DIESEL

SECTOR #												
AGE	1	2	3	4	5	6	7	8	9	10	11	12
NEW	2,430	451	1,597	1,015	689	4,424	9,201	3,996	2,062	218	891	
1 YR OLD	2,157	1,233	2,939	1,176	1,561	4,035	13,061	4,566	4,365	65	507	
2 YR OLD	1,373	441	3,174	1,204	1,423	5,081	13,519	5,779	5,103	74	966	
3 YR OLD	1,063	526	3,020	418	1,327	5,194	9,125	6,705	3,761	243	166	
4 YR OLD	1,288	264	3,605	269	1,764	4,295	7,430	1,918	3,637	48	486	
5 YR OLD	770	1,212	3,435	579	1,287	1,712	5,239	3,206	4,357	34	167	
6 YR OLD	2,000	199	2,566	349	1,291	2,749	6,310	3,709	6,152	145	615	
7 YR OLD	1,745	501	2,389	847	1,590	5,378	6,801	5,749	4,322	36	468	
8 YR OLD	1,676	493	1,882	1,588	1,863	5,665	7,518	3,110	4,036	52	1,507	
9 YR OLD	1,908	897	3,763	394	1,258	4,993	8,344	2,219	6,730	108	963	
10 + YR OLD	7,430	3,885	12,679	3,557	8,355	41,880	41,760	23,821	50,433	1,063	2,690	

NUMBER OF TRUCKS BY FLEET INDICATOR, SIZE, FUEL TYPE, SECTOR, AND AGE (CONTINUED)

8

FLEET INDICATOR=NON-FLEET, SIZE=MEDIUM, ENGTYP=LPG												
AGE	SECTOR #											
	1	2	3	4	5	6	7	8	9	10	11	12
NEW					225							
1 YR OLD												
2 YR OLD			260	1	1,156	3	7					
3 YR OLD					713							
4 YR OLD			2		21	4		2	1			
5 YR OLD	175				244	3	5	3				
6 YR OLD					904							
7 YR OLD												
8 YR OLD					491							
9 YR OLD	188		13		274	5	9	4	102			
10 + YR OLD	1,124	217	500	40	2,749	666	851	326	3,576	110	333	

FLEET INDICATOR=NON-FLEET, SIZE=MEDIUM, ENGTYP=CNG												
AGE	SECTOR #											
	1	2	3	4	5	6	7	8	9	10	11	12
NEW												
1 YR OLD												
2 YR OLD			2						1			
3 YR OLD												
4 YR OLD						1						
5 YR OLD								1				
6 YR OLD												
7 YR OLD												
8 YR OLD									22			
9 YR OLD			2			1	1	1	1			
10 + YR OLD	121	28	132	29	49	313	376	306	1,051	11		

VIUS 1997
TRUCKS BY SECTOR, SIZE CLASS, AGE, AND FLEET INDICATOR

FLEET=1, HEAVY

MDLYR / SECTOR	1	2	3	4	5	6	7	8	9	10	11	12
NEW	9,395	4,821	33,959	7,661	4,729	21,543	18,102	27,693	17,500	2,453	606	5,380
1 YR OLD	8,923	5,218	29,603	8,224	4,636	21,289	20,035	27,507	17,500	1,917	1,411	5,304
2 YR OLD	10,366	5,433	32,513	10,659	6,419	25,548	21,555	27,270	22,075	1,694	1,697	6,174
3 YR OLD	8,617	4,795	23,219	6,213	4,835	19,201	17,763	20,069	14,507	1,421	911	4,696
4 YR OLD	7,931	3,975	19,257	5,035	3,480	14,200	11,962	14,419	12,341	1,060	1,074	3,902
5 YR OLD	4,513	1,758	14,993	2,330	2,345	8,347	9,060	8,304	8,670	885	1,010	2,859
6 YR OLD	4,462	1,801	13,004	2,361	3,735	9,772	7,405	7,232	8,069	1,078	949	2,624
7 YR OLD	4,449	1,878	11,119	2,200	2,951	12,615	10,179	10,033	8,094	923	863	3,267
8 YR OLD	3,060	3,255	8,394	2,219	3,137	15,306	10,165	8,172	9,328	644	1,011	3,467
9 YR OLD	3,721	1,994	8,025	1,800	2,833	15,662	8,487	8,335	8,717	797	1,617	3,357
10 + YR OLD	19,765	8,234	28,803	7,423	19,453	116,425	63,707	33,035	63,908	7,883	7,409	28,033

FLEET=1, MEDIUM

MDLYR / SECTOR	1	2	3	4	5	6	7	8	9	10	11	12
NEW	3,251	566	11,286	5,440	2,252	7,102	10,399	14,312	5,236	140	6,624	10,750
1 YR OLD	2,500	1,213	10,765	2,939	2,096	5,444	17,451	10,606	6,006	220	8,305	11,663
2 YR OLD	7,450	1,298	19,172	2,719	3,215	11,333	22,920	27,470	7,410	241	13,434	17,481
3 YR OLD	3,413	740	12,081	1,833	3,451	8,040	13,420	16,687	7,243	192	6,145	12,419
4 YR OLD	2,550	1,045	8,666	1,621	3,064	5,726	11,453	15,397	3,847	184	6,231	9,810
5 YR OLD	2,844	303	8,283	1,574	1,546	1,883	8,600	8,925	4,191	130	8,525	7,906
6 YR OLD	2,864	223	8,700	1,199	3,857	6,633	7,887	9,083	5,960	88	12,226	10,045
7 YR OLD	4,642	2,554	7,936	951	3,617	9,413	17,719	20,796	4,974	144	8,784	12,863
8 YR OLD	6,404	1,276	6,789	554	2,221	7,141	10,993	21,529	5,769	77	11,106	13,698
9 YR OLD	4,826	782	13,422	991	3,303	4,768	7,581	13,667	6,346	306	8,998	13,307
10 + YR OLD	22,534	6,126	54,712	5,999	23,319	65,621	78,263	49,065	73,116	2,277	35,857	140,971

TRUCKS BY SECTOR, SIZE CLASS, AGE AND FLEET INDICATOR (CONTINUED)

2

FLEET=2(NON-FLEET), HEAVY												
MDLYR / SECTOR	1	2	3	4	5	6	7	8	9	10	11	12
NEW	1,512	1,112	5,322	1,494	1,593	8,429	5,870	4,967	8,521	913	172	
1 YR OLD	1,856	1,368	5,308	1,832	1,927	7,722	6,136	4,271	8,629	423		
2 YR OLD	3,133	1,691	6,967	2,135	1,955	8,103	9,881	7,480	8,972	588	139	
3 YR OLD	2,594	1,416	4,881	1,078	1,356	7,337	7,634	7,192	8,613	708	117	
4 YR OLD	2,773	1,688	4,541	1,693	1,208	6,023	7,801	7,024	8,131	852		
5 YR OLD	2,465	1,098	5,035	1,803	1,274	5,101	6,279	6,417	7,743	511	102	
6 YR OLD	1,704	1,283	3,932	1,236	945	4,881	5,076	5,164	7,176	506	245	
7 YR OLD	1,556	2,111	5,148	2,239	1,078	9,595	8,482	7,526	10,370	695	272	
8 YR OLD	2,592	2,432	4,969	1,863	2,104	11,580	9,750	6,572	14,055	813		
9 YR OLD	2,243	1,345	5,489	1,227	2,006	11,957	9,021	6,964	14,202	864	207	
10 + YR OLD	21,503	13,332	33,341	7,897	18,409	155,918	94,825	51,136	199,117	8,266	1,881	

FLEET=2(NON-FLEET), MEDIUM												
MDLYR / SECTOR	1	2	3	4	5	6	7	8	9	10	11	12
NEW	2,858	541	3,431	1,471	1,076	7,886	14,444	9,627	4,505	254	1,445	
1 YR OLD	3,429	1,431	3,928	1,693	2,325	8,239	18,086	8,143	6,824	127	1,815	
2 YR OLD	1,923	1,460	7,285	1,736	2,944	9,310	21,388	12,566	8,571	243	1,332	
3 YR OLD	1,790	906	4,557	659	2,566	9,315	17,907	13,055	6,990	278	581	
4 YR OLD	1,754	839	4,923	731	2,053	6,008	14,360	7,685	4,784	82	1,063	
5 YR OLD	1,625	1,899	4,822	637	2,074	4,131	8,280	6,088	6,788	168	434	
6 YR OLD	3,069	578	3,592	633	3,498	5,023	12,659	5,406	11,125	192	2,052	
7 YR OLD	2,342	2,219	4,662	1,129	2,488	8,868	13,915	10,822	6,717	181	1,481	
8 YR OLD	3,031	1,332	6,004	2,319	3,480	11,676	20,143	10,767	9,741	311	2,702	
9 YR OLD	4,782	1,740	8,414	815	3,919	12,765	19,636	8,000	14,333	190	1,536	
10 + YR OLD	35,630	17,429	51,467	9,630	35,302	195,251	185,766	92,500	439,921	5,646	10,082	

VIUS 1997
 AVERAGE ANNUAL VMT PER TRUCK BY SECTOR, SIZE, FUEL TYPE AND AGE
 1

SIZE=HEAVY, ENGTYP=GASOLINE

AGE	SECTOR #											
	1	2	3	4	5	6	7	8	9	10	11	12*
NEW	13,906	17,178	21,371	16,636	17,178	16,639	14,117	18,757	15,668	17,178		16,925
1 YR OLD	16,619	14,249	24,148	22,702	19,303	18,069	20,272	28,362	22,809	19,303	9,125	20,985
2 YR OLD	30,738	25,796	19,134	25,549	25,796	22,697	23,404	27,718	25,823	25,796		24,177
3 YR OLD	18,087	16,194	24,347	20,215	17,886	20,992	25,553	17,924	20,491	16,194		20,981
4 YR OLD	11,506	11,854	24,957	17,641	14,889	17,554	19,544	17,490	14,565	11,438		18,282
5 YR OLD	21,705	14,490	15,853	12,414	12,414	16,932	12,312	20,946	11,373	12,414		15,416
6 YR OLD	11,771	11,677	22,714	69,532	11,677	17,141	13,702	14,425	14,648	24,972	40,000	18,315
7 YR OLD	18,476	18,476	15,668	18,476	18,476	17,265	14,863	21,586	19,825	18,476		18,484
8 YR OLD	13,598	10,395	10,377	10,395	10,990	12,097	15,901	44,127	10,463	12,334		17,542
9 YR OLD	9,571	9,571	10,294	9,571	26,698	9,949	15,755	11,895	7,772	9,571		12,757
10 + YR OLD	4,127	3,372	3,354	3,698	4,215	4,380	4,159	3,931	2,861	3,436	4,698	3,621
ALL VEHICLES	7,441	5,587	7,787	8,519	5,961	5,897	7,429	8,589	3,665	5,003	8,943	5,993

SIZE=HEAVY, ENGTYP=DIESEL

AGE	SECTOR #											
	1	2	3	4	5	6	7	8	9	10	11	12*
NEW	77,811	76,437	89,514	95,172	73,686	53,115	75,790	76,648	83,746	65,540	37,368	76,975
1 YR OLD	88,901	94,546	101,573	95,213	78,884	54,481	91,335	92,723	93,090	87,861	20,868	87,228
2 YR OLD	74,357	90,114	89,931	89,675	82,257	51,886	76,545	84,715	86,819	77,952	30,349	78,881
3 YR OLD	76,419	79,479	86,117	87,380	76,823	50,739	75,494	71,577	76,404	63,647	33,456	73,133
4 YR OLD	71,898	76,413	79,590	86,853	67,906	51,344	63,920	76,116	71,344	61,886	16,342	69,836
5 YR OLD	67,605	70,364	69,135	81,896	62,167	50,013	53,221	61,245	63,397	57,581	39,942	61,818
6 YR OLD	65,911	65,637	59,115	81,574	55,983	42,779	56,183	59,628	60,230	45,671	15,464	57,005
7 YR OLD	48,758	54,334	56,760	56,637	52,152	38,348	51,778	51,352	52,069	48,742	16,997	49,640
8 YR OLD	47,830	61,102	55,883	60,958	44,580	34,774	46,925	50,791	48,404	50,149	18,291	46,816
9 YR OLD	42,959	60,443	53,933	53,031	40,340	31,957	34,917	43,110	41,716	56,186	12,401	40,624
10 + YR OLD	23,297	37,276	31,463	36,816	22,669	20,398	19,726	31,250	20,658	28,819	12,788	22,890
ALL VEHICLES	56,991	65,127	72,111	76,523	50,346	33,354	47,896	62,184	46,937	48,884	18,990	51,484

* VMT for Government trucks is the average of all sectors within that size class and fuel type.

AVERAGE ANNUAL VMT PER TRUCK BY SECTOR, SIZE, FUEL TYPE AND AGE (CONTINUED)

2

SIZE=HEAVY, ENGTYP=LPG												
AGE	SECTOR #											
	1	2	3	4	5	6	7	8	9	10	11	12*
NEW												4,066
1 YR OLD	68,740		91,744		20,001	21,663	10,112					58,822
2 YR OLD							49,906		25,807			39,705
3 YR OLD						11,504						12,046
4 YR OLD												29,535
5 YR OLD	12,789	12,789	12,789	12,789	12,789	12,789	12,789	12,789	7,709	12,789		10,501
6 YR OLD												5,495
7 YR OLD												54,980
8 YR OLD	15,055	15,055	15,055	15,055	15,055	15,055	15,055	15,055	14,921	18,632		15,067
9 YR OLD								21,296				18,034
10 + YR OLD	3,713	4,318	4,313	4,315	7,338	2,043	4,322	4,311	6,615	4,304	2,960	4,635
ALL VEHICLES	23,185	4,451	51,729	9,608	11,387	6,943	34,643	4,453	6,660	4,516	2,960	16,929

SIZE=HEAVY, ENGTYP=CNG												
AGE	SECTOR #											
	1	2	3	4	5	6	7	8	9	10	11	12*
NEW												42,807
1 YR OLD	605	605	605	605	605	683	608	605	33,048	605		16,803
2 YR OLD			6,253				7,471		25,807			6,352
3 YR OLD						11,504						26,574
4 YR OLD											13,000	13,021
5 YR OLD	12,789	12,789	12,789	12,789	12,789	12,789	12,789	12,789	7,709	12,789		10,501
6 YR OLD												7,500
7 YR OLD												16,351
8 YR OLD	4,793	4,793	4,793	4,793	18,216	4,793	4,793	4,793	8,695	24,674		17,912
9 YR OLD								21,296				13,701
10 + YR OLD	2,055	228	227	224	297	2,397	2,959	224	3,724	250		3,072
ALL VEHICLES	9,118	380	4,170	1,060	9,071	2,327	2,845	10,714	6,837	496	16,497	7,366

* VMT for Government trucks is the average of all sectors within that size class and fuel type.

AVERAGE ANNUAL VMT PER TRUCK BY SECTOR, SIZE, FUEL TYPE AND AGE (CONTINUED)

3

SIZE=MEDIUM, ENGTYP=GASOLINE

AGE	SECTOR #											
	1	2	3	4	5	6	7	8	9	10	11	12*
NEW	20,130	15,670	11,701	14,818	9,974	15,424	19,808	16,118	14,088	15,670	26,822	16,911
1 YR OLD	15,952	26,531	19,009	25,545	16,222	15,864	16,276	17,078	17,020	16,222	15,150	16,962
2 YR OLD	29,629	19,623	20,408	19,967	17,085	16,619	19,673	19,506	14,476	14,030	15,244	18,914
3 YR OLD	29,160	51,447	18,659	21,884	21,177	17,585	16,407	15,633	20,321	23,699	10,758	17,543
4 YR OLD	20,752	18,786	16,599	21,523	9,630	20,083	19,570	22,021	17,573	18,565	9,796	18,994
5 YR OLD	17,905	21,001	26,892	29,379	15,100	15,016	20,084	24,622	22,485	14,631	12,253	20,322
6 YR OLD	16,354	12,098	18,715	21,387	12,396	15,501	14,228	15,647	14,982	16,398	10,480	14,662
7 YR OLD	11,091	10,028	15,404	9,395	10,996	10,548	18,644	18,725	12,301	22,408	14,512	15,649
8 YR OLD	10,724	12,033	12,432	9,821	11,007	9,402	12,608	17,816	10,822	7,709	8,067	12,302
9 YR OLD	10,380	17,647	14,355	14,599	14,247	10,283	11,735	14,427	10,842	13,571	14,374	12,580
10 + YR OLD	5,157	7,063	8,150	7,545	6,991	5,764	7,134	7,941	3,487	4,645	7,223	5,515
ALL VEHICLES	8,802	10,959	11,606	12,203	8,729	7,787	10,698	12,938	4,650	6,609	10,784	8,563

SIZE=MEDIUM, ENGTYP=DIESEL

AGE	SECTOR #											
	1	2	3	4	5	6	7	8	9	10	11	12*
NEW	33,001	34,807	29,314	30,165	23,460	22,816	25,509	31,621	23,361	22,283	12,971	26,681
1 YR OLD	37,815	41,761	29,606	40,925	24,818	23,516	30,217	33,621	26,584	27,038	13,967	29,605
2 YR OLD	33,561	31,723	29,908	30,954	27,254	25,937	28,633	37,170	31,824	36,253	16,515	29,858
3 YR OLD	43,518	38,556	29,283	38,743	25,189	25,918	28,114	36,215	31,381	20,526	11,169	30,333
4 YR OLD	31,118	26,651	27,510	38,386	23,808	19,427	24,333	29,901	28,926	32,979	14,031	25,890
5 YR OLD	37,790	41,633	30,520	41,112	22,039	24,801	23,540	32,409	23,082	77,549	14,746	27,675
6 YR OLD	17,462	19,142	25,328	46,341	24,076	22,313	17,146	24,976	22,830	18,066	11,737	21,029
7 YR OLD	24,401	19,893	24,247	17,841	25,775	15,595	21,560	18,258	23,131	35,106	12,906	19,979
8 YR OLD	13,724	22,494	20,136	36,958	18,170	11,942	15,869	16,164	18,099	16,903	12,649	16,452
9 YR OLD	22,621	15,060	19,747	50,788	13,262	14,753	17,166	18,705	14,783	16,944	11,313	17,677
10 + YR OLD	11,530	18,618	15,738	17,780	14,800	9,113	12,197	13,228	9,029	8,425	8,339	11,642
ALL VEHICLES	24,509	26,321	23,849	32,153	19,903	15,749	21,013	25,159	17,405	20,318	12,252	20,833

* VMT for Government trucks is the average of all sectors within that size class and fuel type.

AVERAGE ANNUAL VMT PER TRUCK BY SECTOR, SIZE, FUEL TYPE AND AGE (CONTINUED)

4

SIZE=MEDIUM, ENGTYP=LPG

AGE	SECTOR #												
	1	2	3	4	5	6	7	8	9	10	11	12*	
NEW	26,576		19,270		14,002	28,481	21,523						15,621
1 YR OLD	31,374		24,895		29,291								27,203
2 YR OLD	21,368	25,737	27,940	20,208	24,048	17,974	14,682	45,140	19,825	25,737			24,048
3 YR OLD	10,376	33,137	36,704	33,137	18,079	29,973	20,777	34,316	33,137	33,137	16,562		19,644
4 YR OLD	62,039	62,039	30,814	62,039	23,259	25,729	45,587	61,903	62,039	62,039	18,649		26,566
5 YR OLD	25,923	109,778	15,996	109,778	18,806	42,881	58,088	75,157	109,778	109,778			26,172
6 YR OLD	10,296	10,296	21,042	10,296	17,839	9,322	10,350	10,387	10,324	10,296			17,257
7 YR OLD							15,780						13,217
8 YR OLD	15,085	1,538	12,227	1,538	26,841	8,727	44,891	6,023	3,004	1,538			22,770
9 YR OLD	19,660	7,483	14,020	7,483	12,187	24,914	9,626	10,241	3,293	7,483			14,205
10 + YR OLD	6,948	9,059	4,922	8,946	7,979	5,886	4,647	8,884	5,152	2,693	25,209		7,114
ALL VEHICLES	12,309	9,440	19,950	8,324	16,828	7,626	7,824	9,971	5,400	3,513	23,804		13,818

SIZE=MEDIUM, ENGTYP=CNG

AGE	SECTOR #												
	1	2	3	4	5	6	7	8	9	10	11	12*	
NEW	26,576		37,771	8,743	31,155	28,481	21,523						8,350
1 YR OLD													12,050
2 YR OLD	25,737	25,737	26,441	20,208	25,737	17,974	14,682	45,140	19,825	25,737			26,072
3 YR OLD	64,291	60,658	60,658	60,658	41,370	40,546	50,347	62,387	60,658	60,658			53,314
4 YR OLD	62,039	62,039	69,629	62,039	16,438	25,729	45,587	61,903	62,039	62,039	5,973		35,678
5 YR OLD	50,094	109,778	109,778	109,778	109,778	42,881	58,088	75,157	109,778	109,778			1,157
6 YR OLD					37,549		37,353	30,632	27,751				7,084
7 YR OLD							33,190						19,216
8 YR OLD	19,778	19,778	19,778	19,778	5,369	19,764	19,778	19,345	19,510	19,778			8,017
9 YR OLD	5,706	7,483	14,020	7,483	7,483	24,914	9,626	10,241	6,245	7,483			12,454
10 + YR OLD	8,067	2,048	2,106	1,994	2,778	9,686	4,323	8,545	4,098	3,448	9,046		5,341
ALL VEHICLES	9,227	3,597	11,858	8,151	5,150	10,472	5,262	9,209	4,504	3,502	3,300		6,231

* VMT for Government trucks is the average of all sectors within that size class and fuel type.

VIUS 1997

TOTAL VMT FOR 1997 BY SECTOR

SECTOR	SECTOR		VMT
	#	TOTAL VMT	SHARES
CHEMICALS,RUBBER,PLASTIC	01	8,878,079,000	5.9%
PRIMARY METALS	02	5,285,467,986	3.5%
PROCESSED FOODS	03	26,031,042,817	17.2%
PAPER PRODUCTS	04	7,043,457,781	4.6%
PETROLEUM PRODUCTS	05	5,925,258,193	3.9%
STONE,CLAY,GLASS,CONCRETE	06	20,488,067,721	13.5%
METAL DURABLE	07	24,373,313,080	16.1%
OTHER MANUFACTURING	08	25,200,330,240	16.6%
AGRICULTURE	09	24,451,510,369	16.1%
MINING	10	1,793,901,816	1.2%
UTILITY	11	2,174,751,254	1.4%
GOVERNMENT*	12	6,825,268,839	4.5%
TOTAL		151,645,180,257	100.0%

* Government VMT was estimated by multiplying the number of medium government trucks by the average annual VIUS VMT for medium trucks, plus the number of heavy government trucks by the average annual VIUS VMT for heavy trucks.

VIUS 1997
TOTAL VMT FOR 1997 BY SECTOR

SECTOR	SECTOR #	MEDIUM TRUCKS TOTAL VMT	HEAVY TRUCKS TOTAL VMT	MEDIUM & HEAVY TOTAL VMT
CHEMICALS,RUBBER,PLASTIC	01	2,094,397,195	6,783,681,805	8,878,079,000
PRIMARY METALS	02	816,041,837	4,469,426,149	5,285,467,986
PROCESSED FOODS	03	5,058,570,001	20,972,472,816	26,031,042,817
PAPER PRODUCTS	04	1,146,082,330	5,897,375,451	7,043,457,781
PETROLEUM PRODUCTS	05	1,662,847,830	4,262,410,364	5,925,258,193
STONE,CLAY,GLASS,CONCRETE	06	4,381,794,005	16,106,273,716	20,488,067,721
METAL DURABLE	07	8,393,125,646	15,980,187,434	24,373,313,080
OTHER MANUFACTURING	08	7,434,150,669	17,766,179,570	25,200,330,240
AGRICULTURE	09	5,043,708,879	19,407,801,489	24,451,510,369
MINING	10	127,892,909	1,666,008,907	1,793,901,816
UTILITY	11	1,779,640,028	395,111,226	2,174,751,254
GOVERNMENT*	12	3,577,625,344	3,247,643,495	6,825,268,839
TOTAL		158,470,449,095	158,470,449,095	151,645,180,257

* Government VMT was estimated by multiplying the number of medium government trucks by the average annual VIUS VMT for medium trucks, plus the number of heavy government trucks by the average annual VIUS VMT for heavy trucks.

VIUS 1997
 NEW TRUCKS BY FLEET INDICATOR, SECTOR, AND SIZE

SECTOR	SECTOR #	FLEET INDICATOR=FLEET			FLEET INDICATOR=NON-FLEET		
		HEAVY	MEDIUM	TOTAL	HEAVY	MEDIUM	TOTAL
CHEMICALS,RUBBER,PLASTIC	01	9,395	3,251	12,646	1,512	2,858	4,369
PRIMARY METALS	02	4,821	566	5,388	1,112	541	1,653
PROCESSED FOODS	03	33,959	11,286	45,245	5,322	3,431	8,753
PAPER PRODUCTS	04	7,661	5,440	13,101	1,494	1,471	2,965
PETROLEUM PRODUCTS	05	4,729	2,252	6,981	1,593	1,076	2,670
STONE,CLAY,GLASS,CONCRETE	06	21,543	7,102	28,645	8,429	7,886	16,314
METAL DURABLE	07	18,102	10,399	28,501	5,870	14,444	20,313
OTHER MANUFACTURING	08	27,693	14,312	42,006	4,967	9,627	14,594
AGRICULTURE	09	17,500	5,236	22,736	8,521	4,505	13,026
MINING	10	2,453	140	2,593	913	254	1,167
UTILITY	11	606	6,624	7,230	172	1,445	1,617
GOVERNMENT	12	5,380	10,750	16,130			
TOTAL		153,842	77,359	231,201	39,905	47,538	87,443

SHARE OF MILES IN URBAN AREAS, 1997 AND 1998

	Urban miles (millions)	Total miles (millions)	Share
	1997	1997	1997
Medium Trucks	31,836	66,893	47.59%
Heavy Trucks	44,943	124,584	36.07%
	1998	1998	1998
Medium Trucks	33,122	67,894	48.78%
Heavy Trucks	47,856	128,159	37.34%

Source:

U.S. Department of Transportation, Federal Highway Administration, Highway Statistics 1998, Washington, DC, 1999, Table VM1, p. V47.

VIUS 1997
 FUEL ECONOMY (MPG) BY SIZE, FUEL TYPE AND AGE

SIZE=MEDIUM

SIZE=HEAVY

AGE	GASOLINE	DIESEL	LPG	CNG	GASOLINE	DIESEL	LPG	CNG
NEW	8.55938	8.48462	5.14602	5.89747	9.09430	6.26224	7.54532	5.56074
1 YR OLD	9.15906	8.83929	5.69105		8.59393	6.10237	4.75677	7.73772
2 YR OLD	8.48974	8.43387	5.82966	9.84996	8.08873	6.15891	7.06584	7.49896
3 YR OLD	8.80769	8.65505	6.35182	9.76057	8.51783	6.12948	7.99987	5.50000
4 YR OLD	8.97485	8.38702	5.96608	7.97772	6.85549	6.11884	8.00000	10.49809
5 YR OLD	8.72005	8.25991	4.82901	5.01227	7.89165	6.29103	7.70000	7.70000
6 YR OLD	8.63522	8.22619	6.21448	7.60000	5.92985	5.98831	5.00000	
7 YR OLD	8.42333	8.36816	6.03151	4.79054	8.02504	5.99802	4.00028	6.48052
8 YR OLD	8.39867	8.91005	7.43286	6.81131	8.34495	5.86418	3.50468	5.90000
9 YR OLD	8.39935	8.12454	5.10676	7.75425	7.63721	5.74797	6.53280	4.00387
10 + YR OLD	7.76439	7.67455	6.65446	7.11279	7.09995	5.60765	5.88435	5.34362
TOTAL	7.99135	8.23274	6.32660	6.67219	7.23639	5.91670	5.87161	6.10575

** Following the previous methodology, medium trucks with fuel economy greater than 13 and heavy trucks with fuel economy greater than 11 were not used in these calculations.

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