Quarterly Analysis Review Meeting
July 21, 1997

Presented by Phil Patterson

Supported by the Laboratory Analytic Team

John Maples

Carol Hammel (Vince Schaper)

Jim Moore

Action Items from the Last Quarterly Review

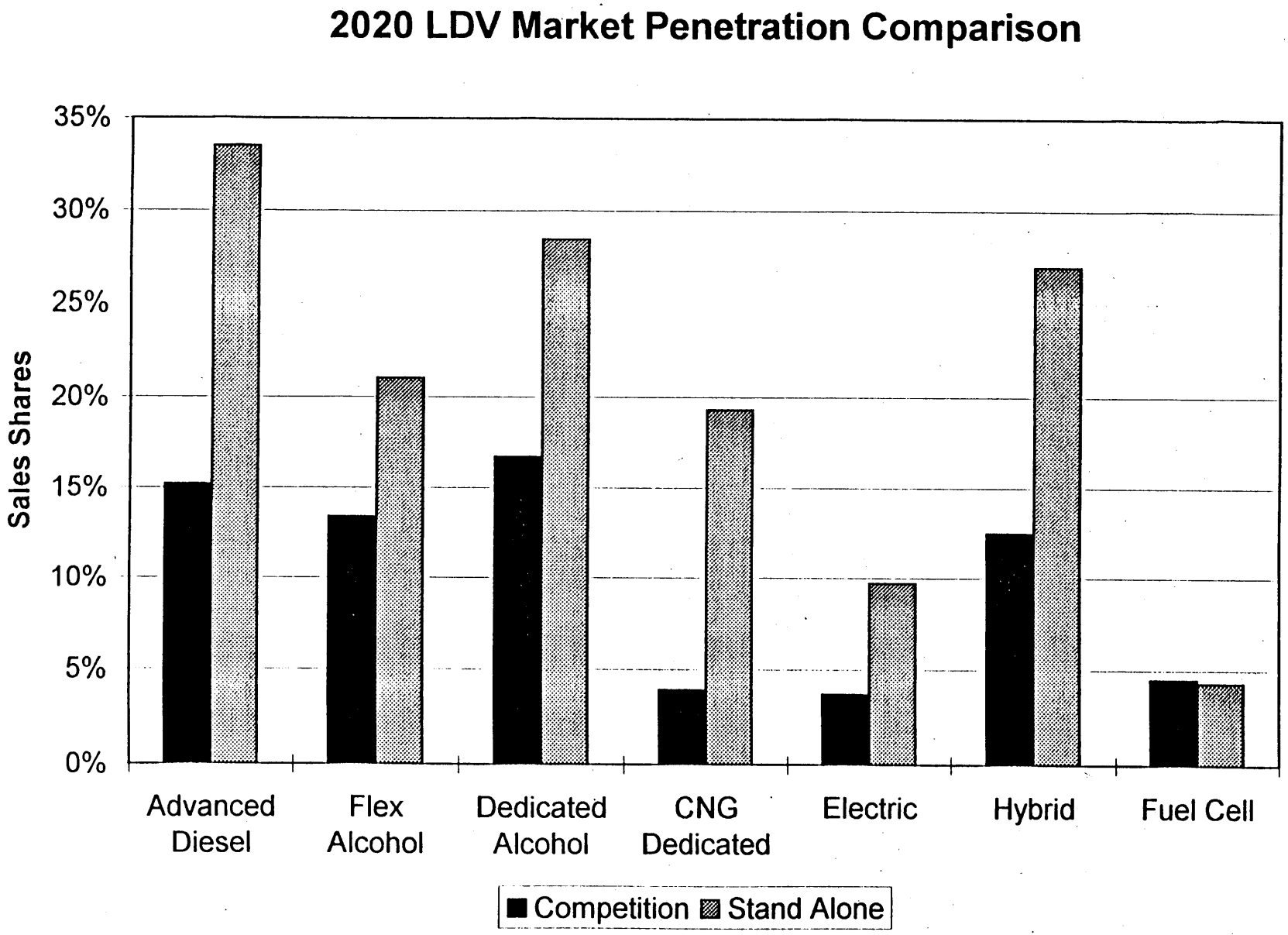
1. Plan for TAFV Expansion for Hybrids and Diesels
2. Grid Connected HEV
3. Focus on Analysis Results and Implications
4. Interface of TAFV and Quality Metrics
5. Wang/Delucchi Comparison
6. Doe Strategic Plan
7. Light Vehicle Diesel Analysis

Adding Hybrids and Diesels To TAFV

Aggregate Analysis	Money	Time
HEV	$30k	3 months
Diesel	$5k	2 weeks
Detailed Analysis		
HEV	$75k	6 months
Diesel	$20k	2 months

Why a Grid-connected Hybrid is Being Analyzed

- For a hybrid to obtain ZEV credits in California, it will probably have to be able to plug into the electric power grid.
- Grid Connection can:
  - Yield substantial oil reductions,
  - Offer energy security benefits and emissions advantages
  - Offer improved acceleration compared to EVs
- Some consumers may prefer a vehicle that they can fuel at home.


2020 LDV Market Penetration Comparison
Sales Shares
35%
30%
25%
20%
15%
10%
5%
0%
Advanced Diesel
Flex Alcohol
Dedicated Alcohol
CNG Dedicated
Electric
Hybrid
Fuel Cell
Competition
Stand Alone

TAFV Model and Quality Metrics Analysis

TAFV Model	OTT Impact Analysis (Quality Metrics)
• Currently deals only with alternative fuels	• Addresses fuels and advanced technologies
• Tends to "pick a winner"	• Can accept a "winning fuel" for analysis
• No ethanol blends	• Includes ethanol blends

GHG Fuel Cycle Models

Delucchi (for PO)

- More Research Oriented
- Most Detailed on GHG
  - Includes five gases for which IPCC has not given weights
- Select year for analysis (tied to EIA projections

Wang (for OTT)

- More Applications Oriented
- Includes criteria emissions
- Shows energy and oil use
- Best guess of year 2005 technology
- Easily modified (as for Dallas and heavy trucks)

- Both analysts can (and do) make checks on one another
- A July 30 meeting to be held on the issue of corn ethanol

TABLE OF CONTENTS

	Page
Message from the Secretary	ii
The Department of Energy Is....	1
The Changing World	2
The Changing Government	3
The Strategic Response	3
Our Unique Capabilities	5
The DOE Mission	6
The DOE Vision	6
Our Core Values	7
Key Customer and Stakeholder Considerations	7
DOE's Four Businesses	8
Corporate Management	8
DOE's Strategic Goals	10
Energy Resources	10
National Security	14
Environmental Quality	21
Science and Technology	25
Corporate Management	29

Diesel Survey by Opinion Research, July 1997

- 1010 phone survey to national U.S. sample population

Would you consider buying a diesel engine version that got 40% better fuel economy and cost $1,500 additional for your next new vehicle purchase?

	Yes
Total Sample	**22%**
Female	17%
Age 18-24 Age 55-64	34% 16%
South West	19% 25%
Black Hispanic	15% 35%
$50,000+ Income 3+ Persons in Household College Grad	26% 26% 27%

Diesel Survey by Opinion Research, July 1997

Reasons diesel would not be considered:

Reason	Total	Note
Noise	20%	higher for the older, more wealthy, and better educated
Fuel Availability	15%	very little concern by blacks and persons with less than high school education
Smell, Odor	12%	more concern to older persons
Pollution, Smoke, Environmental	9%	very important in the west
Cold Start Problem	7%	most concern in the North Central region

Diesel Survey by Opinion Research, July 1997

Would consider buying a diesel vehicle that got 40% better fuel economy and cost $1,500 additional and also had the same tailpipe emissions, engine noise, vehicle odor, acceleration, reliability, and cold start ability as a gasoline vehicle.

	Yes	Original Response
Total Sample	**53%**	**22%**
Male	63%	27%
Age 18-24	65%	34%
Age 65+	34%	11%
South	49%	19%
West	62%	25%
Hispanic	69%	35%
Less than $15k	43%	20%
$50k+	61%	26%
Less than H.S.	46%	23%
College Grad	56%	27%

Diesel Fuel Production Effects Due to Accelerated Growth of Diesel Engines In Light Vehicles

Status Report

July 21, 1997

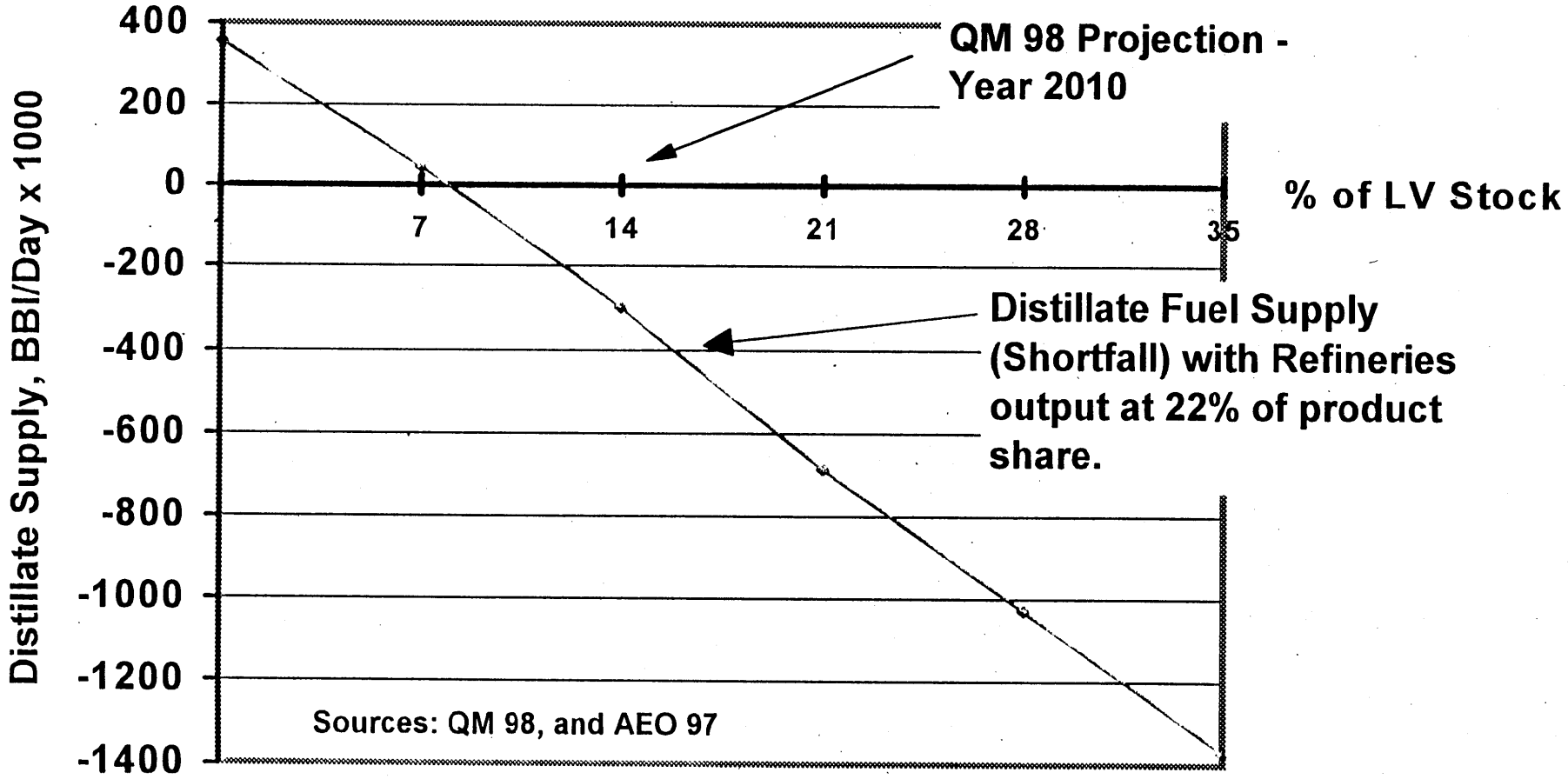
Analytic Team

2

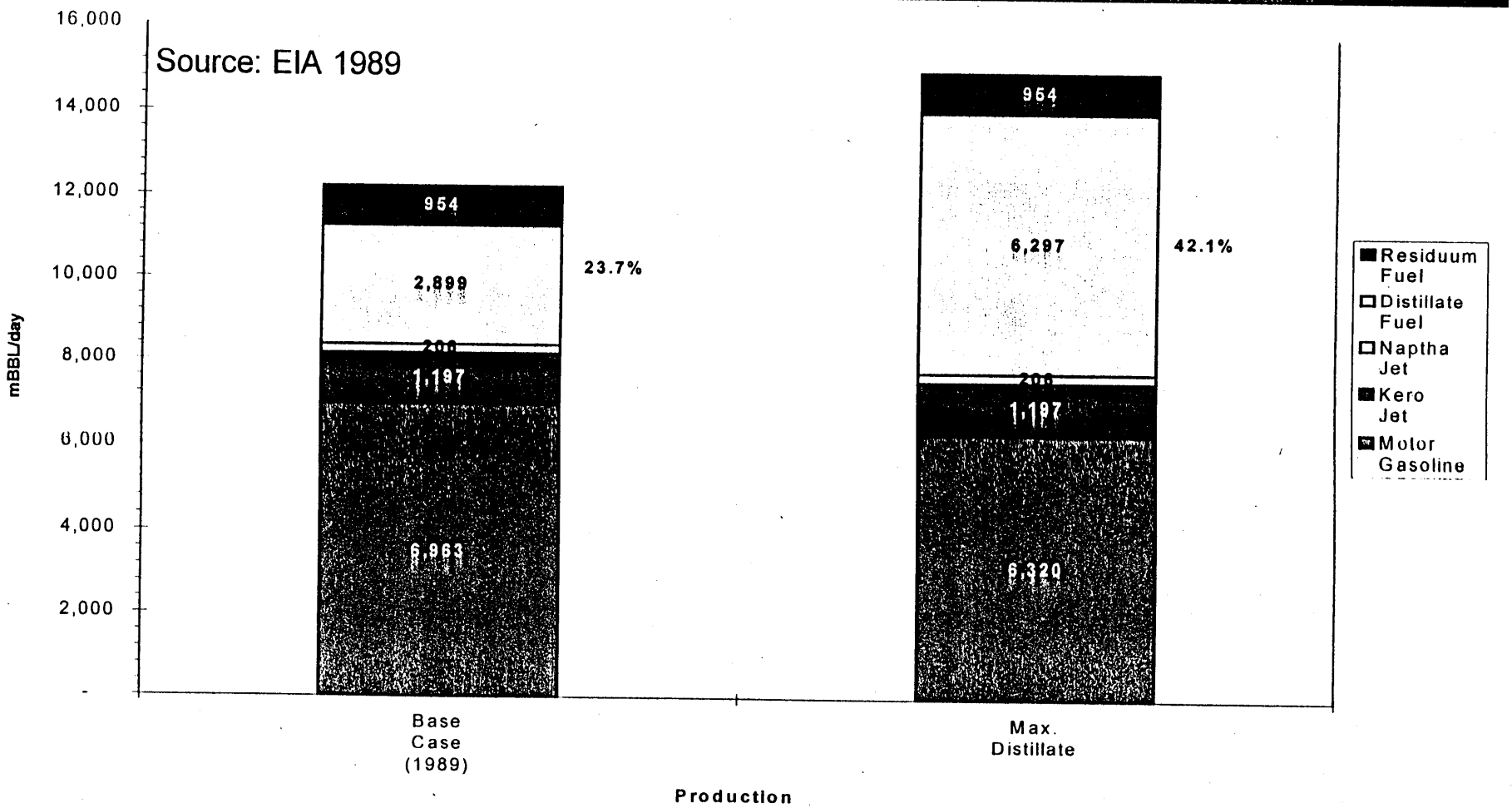
Purpose

- To assess refinery and other supply-side effects of significant growth in the use of diesel light-vehicles (LVs)
- *What happens to the fuel supply picture if OTT's light diesel program is successful?*

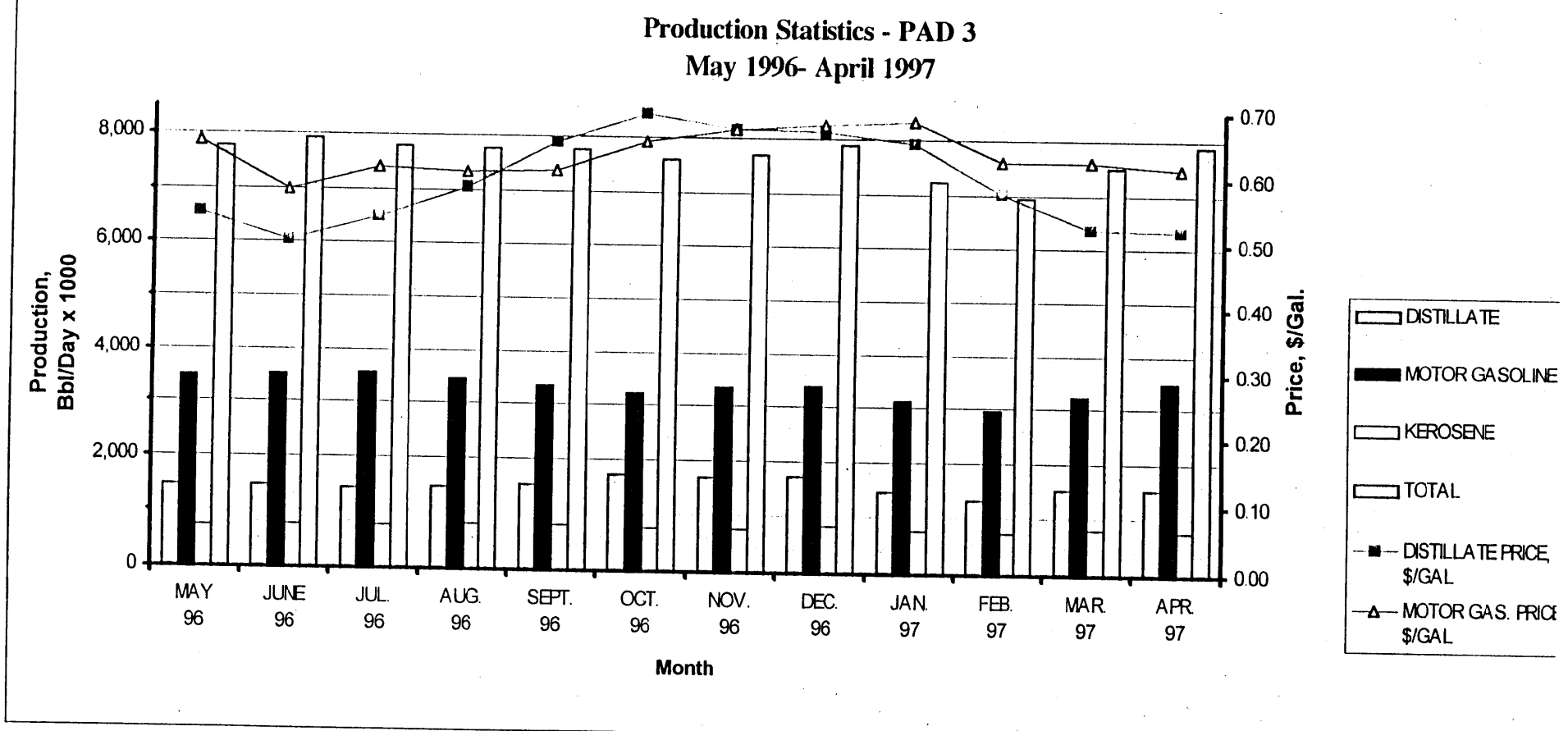
Effects of Increased Market Share of Diesel Fueled Light Vehicles



Maximum Distillate Production Estimate



Refinery Production Statistics- May 1996 - Apr. 1997

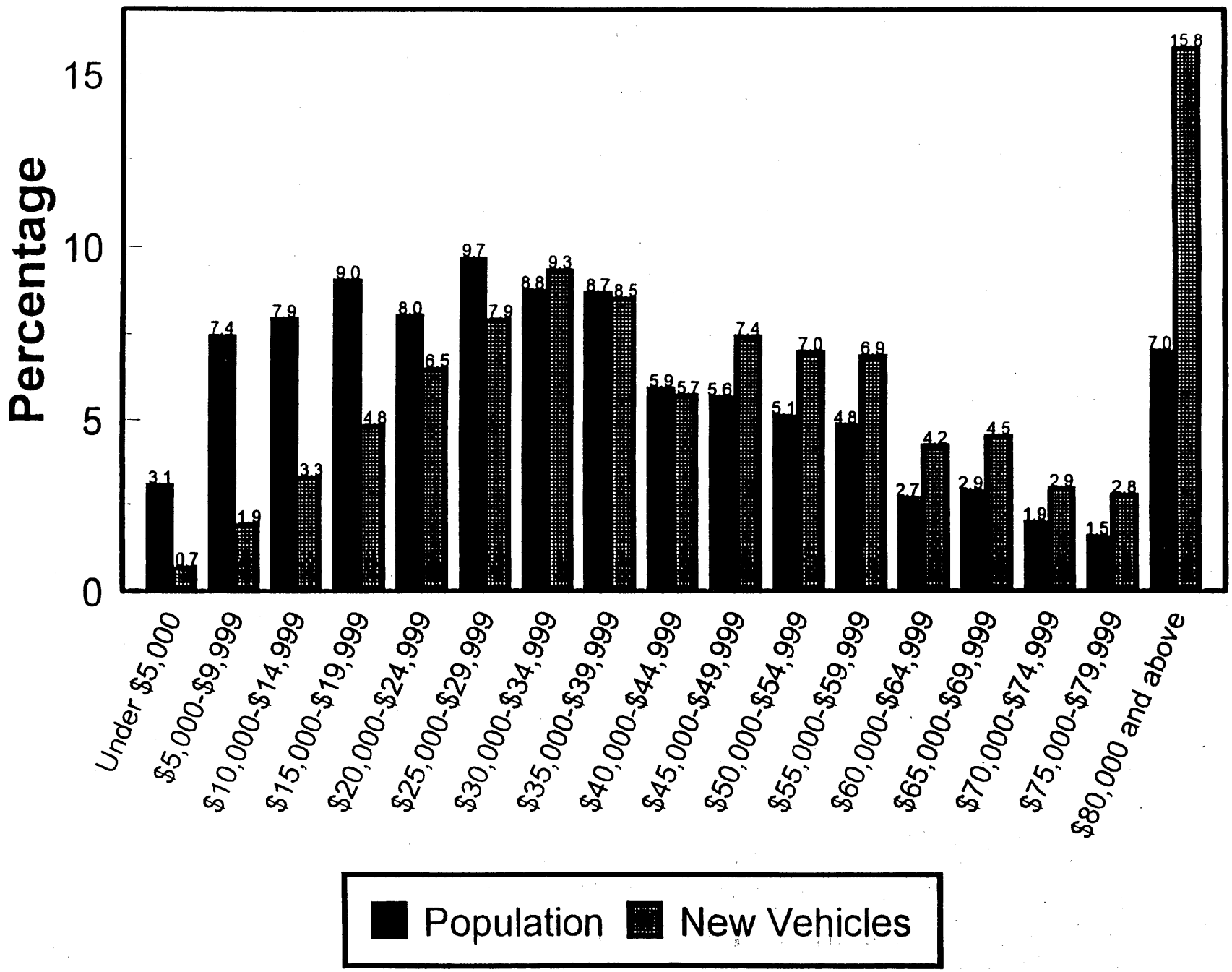


Consumer Study

Purpose: *Inform OTT managers on what is important in the market place to ensure that the technology OTT develops meets the needs and desires of consumers.*

Status:

- *Information collection and analysis substantially complete.*
- *Preliminary Draft in progress.*



Population over 16 years of age.

Source: 1990 Nationwide Personal Transportation Survey

Female Vehicle Buyers

- 54.3% of new and used vehicle purchasers are female.
- 59.2% of future passenger car buyers will be females.
- 61.4% of future minivan buyers will be females.
- 53.8% of future sport utility buyers will be females.

Dorhing National Survey (12/95)

Future Sport Utility Buyers

Age	Male	Female
18-24	7%	4%
25-34	15%	17%
35-49	14%	24%
50-64	9%	8%
65+	2%	1%
Total	46%	54%

Dorhing National Survey (12/95)

Vehicle Types Owned and Preferred

Vehicle Type	Owned	Preferred
Cars	1.30	1.06
Vans	0.15	0.27
Pickups	0.32	0.38
Sport Utilities	0.13	0.34
Total	1.95	2.05

University of Michigan, Survey Research Center (8/94)

Consumer Groups

JD Power (11/96)

Group	% Buyers	Definition
Affluent Enthusiasts	12%	high income, performance and driving enjoyment, status conscience
Mature Sensibles	16%	low income, older, safety and quality important
Domestic Indulgents	20%	high income, status, favor size and domestic orgin, brand loyalty
Practical Enthusiasts	20%	low income, performance and value, four doors
Young Sensibles	15%	reliability and quality, value, practical, warranty
Utility Seekers	16%	functional, utility, passenger and cargo space, safety

Vehicle Combinations

Two Vehicle Households

Vehicles	Owned	Preferred
2 Cars	40%	16%
1 Car, 1 Truck	52%	64%
2 Trucks	8%	20%

University of Michigan, Survey Research Center (8/94)

Most Important Vehicle Attribute

Attribute	Male	Female	Total
Dependability	36%	30%	33%
Safety	21%	36%	28%
Quality	24%	14%	19%
Low Price	10%	11%	10%
Fuel Economy	7%	6%	7%
Don't Know	2%	3%	3%

Opinion Research Corp. (12/96)

Ford Market Research on HEVs

- Conducted 50 personal interviews during January 1995 in Sunnyvale, CA.
- Participants owned 1993 model year or newer vehicles (mostly midsize cars).
- Participants were environmentally and technology oriented.

Ford Model Data				
	Standard Sedan	Hybrid Sedan		Input Ran
Vehicle Cost Increment ($100's)	$0	$20	66.33%	5-50
Top Speed (mph)	115	100	99.80%	60-100
Sustained Hill Climbing Speed (mph)	70	50	31.80%	45-65
EPA Gas Mileage (mpg)	27.5	60	108.20%	20-60
0-40 Acceleration (seconds)	5	6	81.40%	4-8
40-60 Acceleration (seconds)	6	8	48.40%	4-8
Warranty (years)	3 to 7	5	70.42%	1-7
AVERAGE LIKELIHOOD TO BUY	72.34%			
MULTIPLE LIKELIHOOD TO BUY	6.32%			

Ford Model Data					
	Standard Sedan	Hybrid Sedan		Input Range	
Vehicle Cost Increment ($100's)	$0	$20	66.33%	5-50	
Top Speed (mph)	115	100	99.80%	60-100	
Sustained Hill Climbing Speed (mph)	70	65	86.40%	45-65	
EPA Gas Mileage (mpg)	27.5	60	108.20%	20-60	
0-40 Acceleration (seconds)	5	5	90.60%	4-8	
40-60 Acceleration (seconds)	6	6	74.20%	4-8	
Warranty (years)	3 to 7	5	70.42%	1-7	
AVERAGE LIKELIHOOD TO BUY	85.14%				
MULTIPLE LIKELIHOOD TO BUY	29.30%				

EV Ownership Considerations

Advantages		Disadvantages	
Environmental	50%	Inconvenient	37%
Operating Costs	18%	Limited Range	24%
None	8%	Cost	10%
Energy Savings	4%	Performance	9%
Convenience	4%	Repairs	3%

Cambridge Research International (5/93)

JD Power California EV Survey

- February 1997
- Two Metro Areas: Los Angeles, San Diego
- 400 Phone Interviews
- Households of $75,000+ income

Purpose:

1. Determine awareness of alternative and electric vehicles
2. Find attitudes towards EVs
3. What effect does awareness have on manufacturer image and purchase intent?

JD Power Survey on EVs

- 64% of respondents aware of AFV and/or EV
- Would consider buying or leasing an EV?

Aware of AFV/EVs	27%
Other	13%

- What manufacturer is at the top of your list?

	GM	Ford	Honda	Toyota
Aware	46%	11%	7%	2%
Not Aware	6%	13%	19%	25%

Analytic Homepage

This Quarter:

- 12 new Facts of the Week
- SAE Presentation from Gov't/Industry Meeting
- Results from last meeting
- More on Student Competitions

Third highest hits within OTT Homepage (8/96 - 7/97) after "What's New" and "Coloring Book"

www.ott.doe.gov/fact.html

DOE Policy Office

Cost Estimation of Fuel Economy Technologies

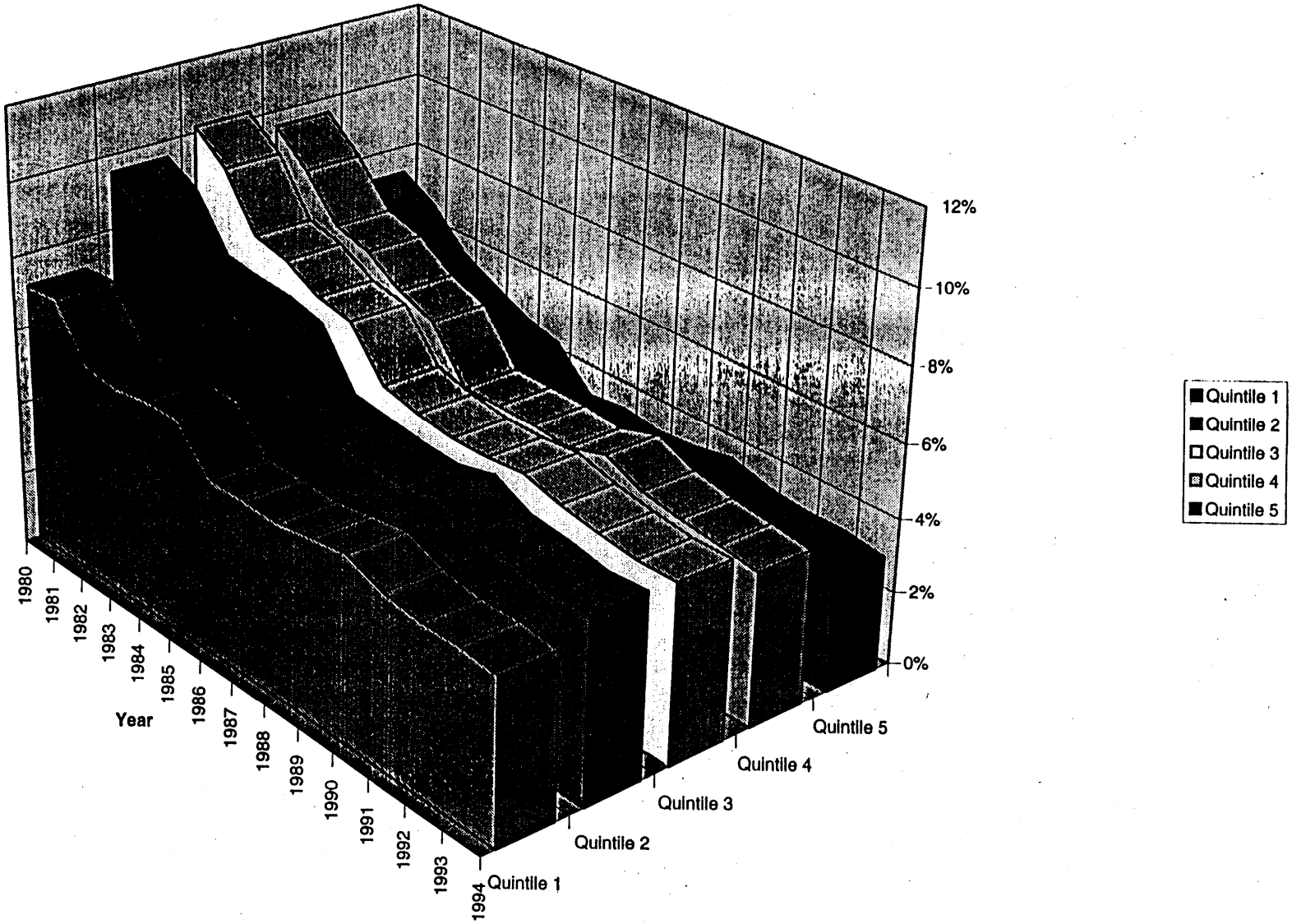
Three Methods:

- Detailed Manufacturing or Engineering Process Cost
- Purchased Components and Individually Priced Options
- Statistical Techniques

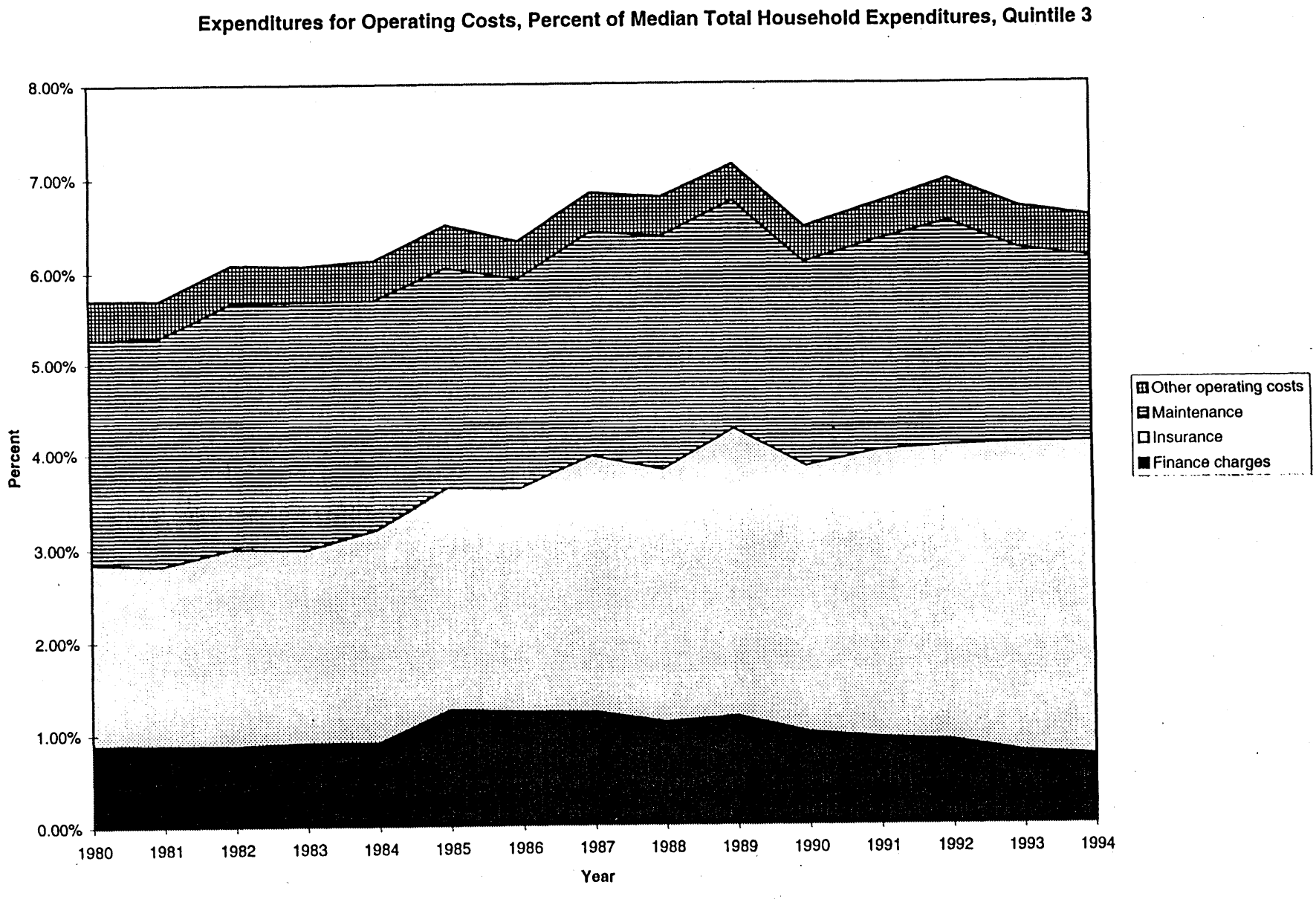
Contractors: EEA, Harbour and Associates, National Economic Research Associates (NERA).

Graphic 1

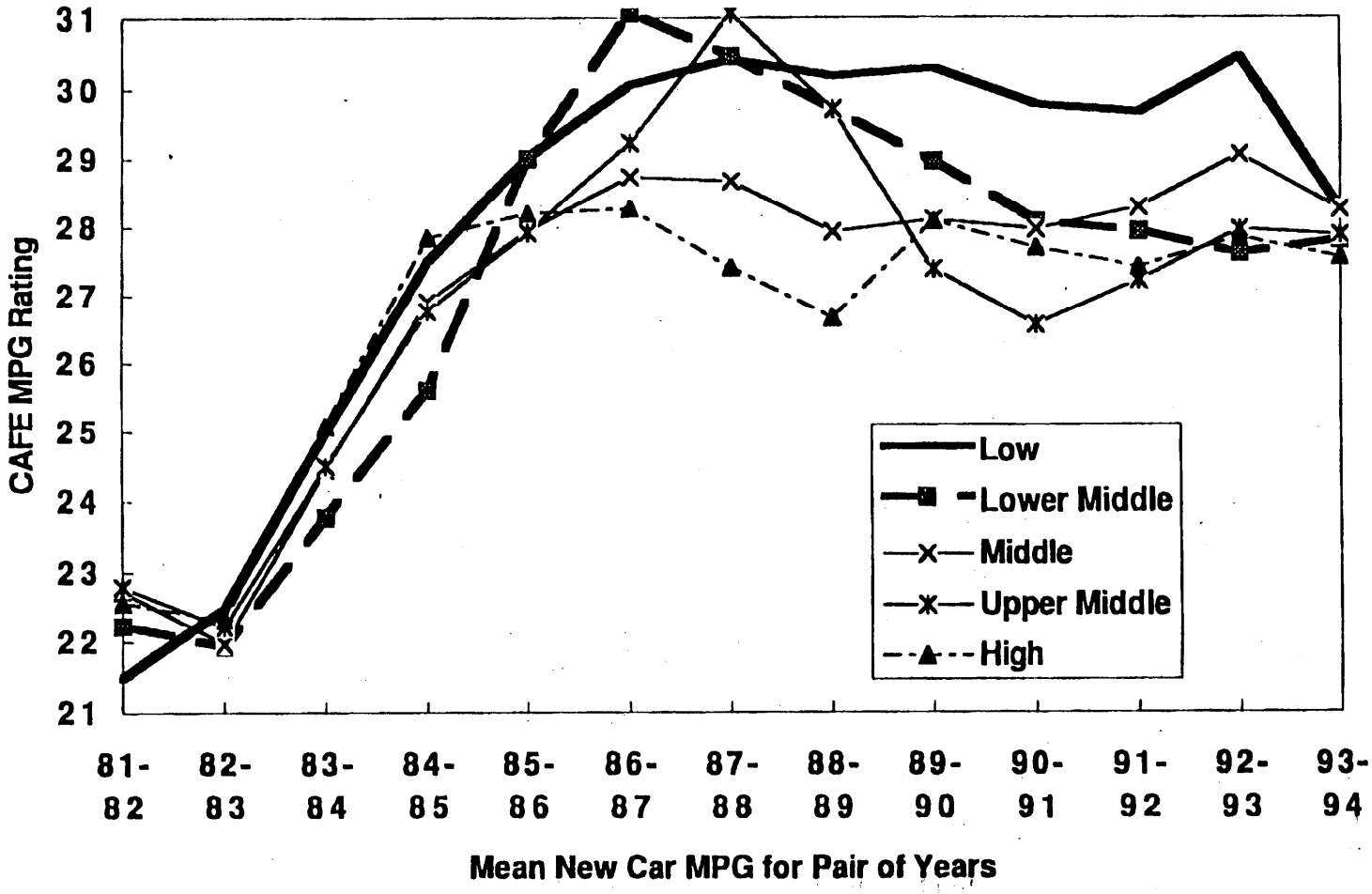
Expenditures for Gasoline, Percent of Median Total Household Expenditures



Graphic 4


Expenditures for Operating Costs, Percent of Median Total Household Expenditures, Quintile 3
8.00%
7.00%
6.00%
5.00%
4.00%
3.00%
2.00%
1.00%
0.00%
Percent
1980
1981
1982
1983
1984
1985
1986
1987
1988
1989
1990
1991
1992
1993
1994
Year
Other operating costs
Maintenance
Insurance
Finance charges

Throughout the Latter Half of the 1980s, Lower Income HHs Chose the Most Efficient New Vehicles, When New Vehicles Were Purchased



Based on Greening Expenditure Shares Estimates from CRS Data Base, New Car MPG Separately Attached

PROPOSED DATA BOOK OUTLINE

Transportation Energy Data Book: Edition 18
U.S. Dependence on Oil

1. World Oil Situation
2. U.S. Oil Supply and Consumption
3. Transportation Oil Use
4. Light Vehicle Oil Use
   - Number of Vehicles
   - Miles of Travel
   - Fuel Economy and Regulation
5. Heavy Vehicle Oil Use
6. Other Transportation Modes
7. Environmental Impacts and Regulations
8. Alternative Vehicle Technologies
9. Alternative Fuels and Technologies
10. Vehicle Buyers and Users
11. Transportation and the Economy
12. Implementing Alternative Technology and Fuels

Requests (= Hit)

A request occurs when a web server is asked to provide a page, graphic or other object. This is frequently called a Hit. Requests may be generated either by visitor going to a page or by the page itself requesting an object (usually a graphic). Using the number of requests to gauge the popularity of a site can be misleading because pages with lots of embedded graphics can generate many more requests than sites with simpler graphics. For that reason, the number of visits or the number of HTML page requests will probably give a more accurate activity picture.

Visitors

A visitor is usually defined simply as a unique IP address. A particular IP address may represent a unique person but, more often, one IP is shared by many people. If your site uses persistent cookies to better identify people, Hit List can also produce reports that calculate visitors based on a combination of unique IP addresses and cookies.

Visits

A visit is a collection of requests that represent all the pages and graphics seen by a particular visitor at one time. For example, a visitor to your site may go to 10 HTML pages and indirectly request 25 graphic elements. Those 35 requests represent one visit. The total number of visits is usually more than the total number of visitors because each visitor can visit the site more than once. Visits are just estimates because there is no way to be certain that a series of requests actually belongs to the same person, or, for that matter, to the same person during the same visit. Hit List determines visits based on several factors including IP addresses, cookies and the delay between consecutive requests.

Report generated by Marketwave Hit List. http://www.marketwave.com/ Phone: +1 206 682 6801

Summary

Total Number of Requests	1,850
Total Number of Visitors	384
Total Number of Visits	609
Average Visits Per Day	20.3

Most Popular Visitor's Organizations

Shows which organizations (US commercial, US educational, etc.) visitors are coming from. These numbers are just estimates because they are derived from the extension (.com, .net, .jp, etc.) of the requesting server's name. This list cannot be generated unless the 'Lookup site names' feature has been used to resolve IP addresses into names.

Organization	Total Requests	Visits
US Commercial (.COM)	569	211
US Educational (.EDU)	434	143
US Network (.NET)	108	67
US Military (.MIL)	65	13
US Government (.GOV)	14	7
US Organization (.ORG)	15	5

Most Popular Visitor's Countries

Shows which countries visitors are coming from. These numbers are just estimates because they are derived from the extension (.com, .net, .jp, etc.) of the requesting server's name. This list cannot be generated unless the 'Lookup site names' feature has been used to resolve IP addresses into names.

Country	Total Requests	Visits
United States	1,226	455
France	119	4
Canada	26	14
Germany	10	2
Australia	7	7
Finland	7	2
Netherlands	5	3
Switzerland	5	1
Ireland	3	2
United Kingdom	3	3

37

Most Popular Pages

Shows which pages (and Applications and Downloads) are most commonly requested by visitors.

Group Name	Total Requests
Table 2.1 Refinery Yield of Petroleum Products from a Barrel of Crude Oil, 1978-1993 /data/tedb15/tab21.htm	76
The Transportation Energy Data Book: Edition 15 /data/tedb15/tedb15.htm	70
Transportation Energy Data Book: Edition 15 /data/tedb15/toc.htm	56
The Transportation Energy Data Book: Edition 15 Energy Characteristics Menu /data/tedb15/trengch.htm	40
The Transportation Energy Data Book: Edition 15 Energy Menu /data/tedb15/energy.htm	37
Table 2.6 Consumption of Total Energy by End-Use Sector, 1970-93 /data/tedb15/tab26.htm	31
Table 2.7 Domestic Consumption of Transportation Energy by Mode and Fuel Type, 1993(a) /data/tedb15/tab27.htm	28
The Transportation Energy Data Book: Edition 15 Consumption Menu /data/tedb15/consume.htm	27
Table 2.2 United States Petroleum Production and Consumption, 1970-93 /data/tedb15/tab22.htm	27
Transportation Energy Data Book: Edition 15 Introduction /data/tedb15/intro.htm	24

38