

Alcohol Fuel Flexibility: Progress and Prospects

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California Energy Commission

Fifteenth International Symposium on Alcohol Fuels

San Diego, California

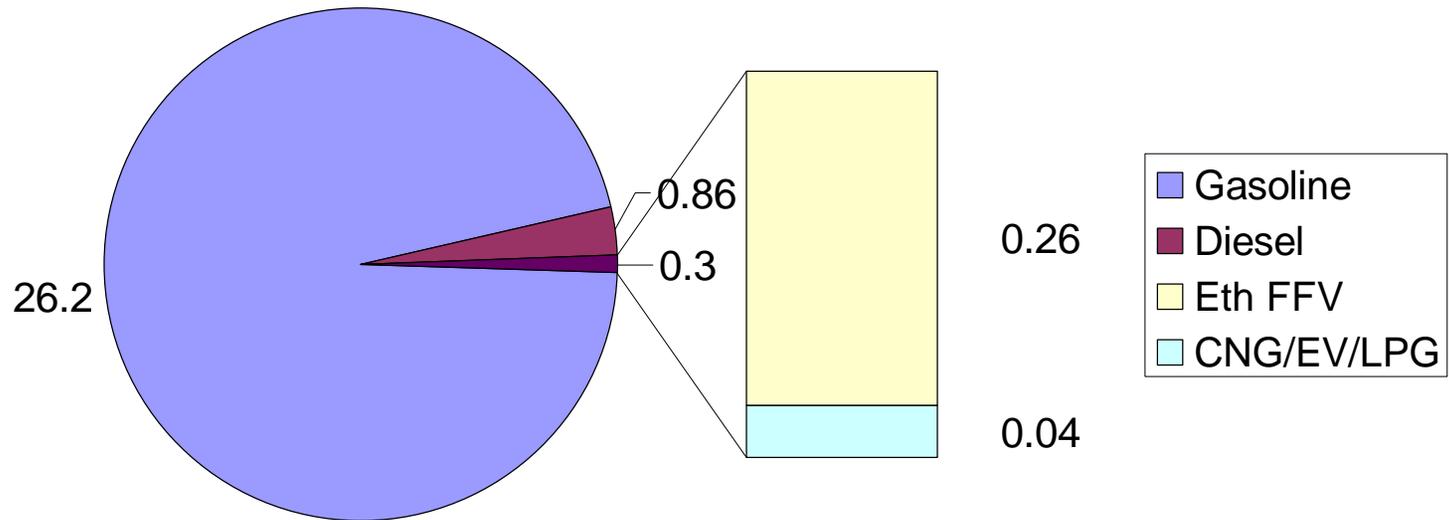
September 26-28, 2005



First FFV Demonstrated in California – Ford Escort 1986



Ethanol FFVs as part of California's Motor Vehicle Population

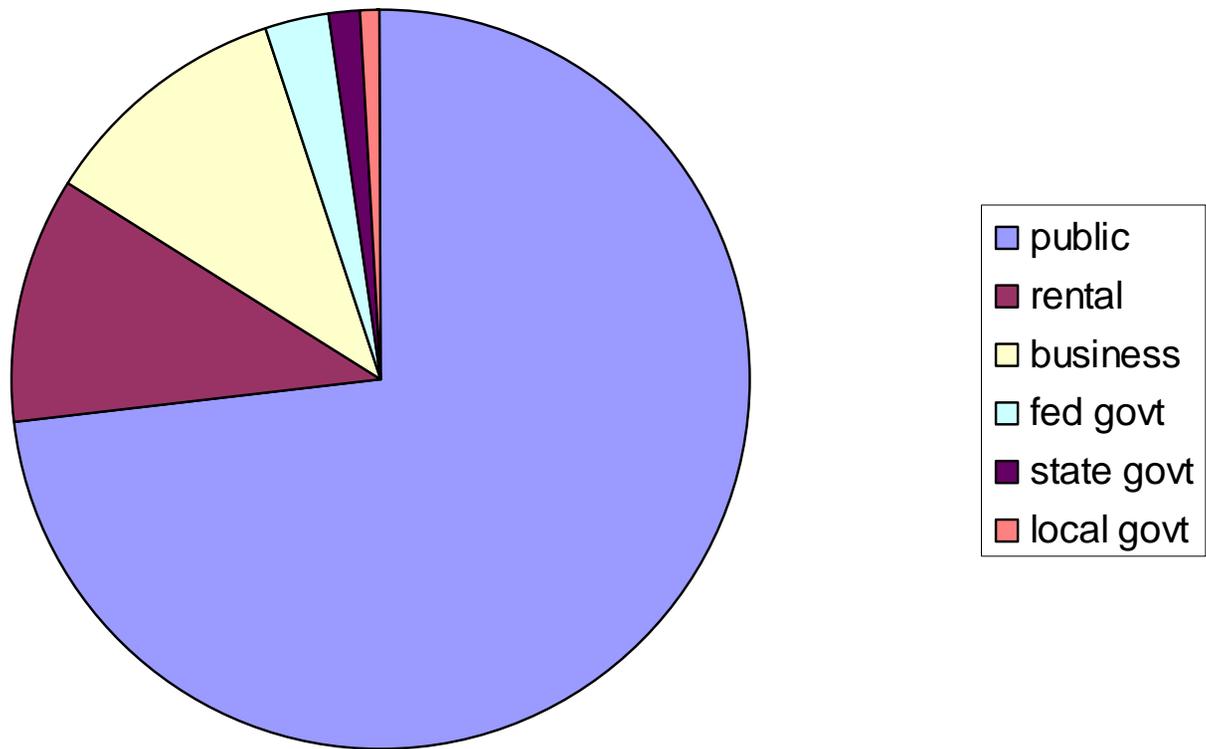


Numbers are Millions of Vehicles

Data from California Energy Commission/California Department of Motor Vehicles joint-agency database project – April 2005



Ownership of Ethanol FFVs in California



E85 vs Gasoline Pricing – Two Minnesota Examples



Model Year **2005** **Fuel Economy Guide**

www.fueleconomy.gov



U.S. Department of Energy
Office of Energy Efficiency and Renewable Energy
U.S. Environmental Protection Agency

**E85 > Gasoline Fuel
Substitution Factor Avg. for
2005 FFV Models**

= 1.34

ETHANOL FLEXIBLE-FUEL VEHICLES

This section contains the driving range and fuel economy values for ethanol flexible-fuel passenger cars and light trucks. Ethanol flexible-fuel vehicles are designed to operate on gasoline, E85 (a mixture of 85% ethanol and 15% gasoline), or any mixture of the two fuels. Annual fuel cost is estimated assuming 15,000 miles of travel each year (55% city and 45% highway) and an average fuel cost of \$1.65 per gallon of E85, \$1.80 per gallon of regular unleaded gasoline, and \$1.95 per gallon of premium unleaded gasoline.

The driving range and fuel economy values are shown for both gasoline and E85. When operating your FFV on mixtures of gasoline and E85, such as when alternating between using these fuels, your driving range and fuel economy values will be somewhere between those listed for the two fuels, depending on the actual percentage of gasoline and E85 in the tank.

	Trans Type / Speeds	Eng Size / Cylinders	MPG City / Hwy	Annual Fuel Cost	Fuel	Range (miles)
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COMPACT CARS

CHRYSLER						
Sebring Conv	A-4	2.7/6	15/20	\$1,455	E85	270
			21/28	\$1,174	Gas	390
Sebring Conv (2-Mode)	A-4	2.7/6	15/20	\$1,455	E85	270
			21/28	\$1,174	Gas	390
MERCEDES-BENZ						
C240 FFV	A-5	2.6/6	14/19	\$1,547	E85	310
			20/25	\$1,331	P	420
C320 FFV	A-5	3.2/6	14/19	\$1,547	E85	310
			20/26	\$1,331	P	430
C320 Sports Coupe FFV	A-5	3.2/6	14/18	\$1,651	E85	300
			19/24	\$1,392	P	400

MIDSIZE CARS

CHRYSLER						
Sebring 4-dr	A-4	2.7/6	15/20	\$1,455	E85	270
			21/28	\$1,174	Gas	390
Sebring 4-dr (2-Mode)	A-4	2.7/6	15/20	\$1,455	E85	270
			21/28	\$1,174	Gas	390
DODGE						
Stratus 4-dr	A-4	2.7/6	15/20	\$1,455	E85	270
			21/28	\$1,174	Gas	390
Stratus 4-dr (2-Mode)	A-4	2.7/6	15/20	\$1,455	E85	270
			21/28	\$1,174	Gas	390

MERCURY						
Sable	A-4	3.0/6	15/20	\$1,455	E85	310
			19/27	\$1,228	Gas	390

LARGE CARS

FORD						
Taurus	A-4	3.0/6	15/20	\$1,455	E85	310
			19/27	\$1,228	Gas	390

MIDSIZE STATION WAGONS

FORD						
Taurus Wagon	A-4	3.0/6	14/19	\$1,547	E85	290
			19/26	\$1,285	Gas	390

MERCURY						
Sable Wagon	A-4	3.0/6	14/19	\$1,547	E85	290
			19/26	\$1,285	Gas	380

SMALL STATION WAGONS

MERCEDES-BENZ						
C240 Wagon FFV	A-5	2.6/6	14/19	\$1,547	E85	310
			20/25	\$1,331	P	420

SPORT UTILITY VEHICLES 2WD

CHEVROLET						
C1500 Avalanche 2WD	A-4	5.3/8	11/14	\$2,062	E85	310/540*
			14/19	\$1,688	Gas	410/690*
C1500 Suburban 2WD	A-4	5.3/8	11/15	\$1,903	E85	310/540*
			15/19	\$1,688	Gas	410/690*
C1500 Tahoe 2WD	A-4	5.3/8	11/15	\$1,903	E85	310/540*
			15/19	\$1,688	Gas	410/690*

	Trans Type / Speeds	Eng Size / Cylinders	MPG City / Hwy	Annual Fuel Cost	Fuel	Range (miles)
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FORD

Explorer 2WD FFV	A-5	4.0/6	11/15	\$1,903	E85	290
			15/20	\$1,588	Gas	380
GMC						
C1500 Yukon 2WD	A-4	5.3/8	11/15	\$1,903	E85	310/540*
			15/19	\$1,588	Gas	410/690*
C1500 Yukon XL 2WD	A-4	5.3/8	11/14	\$2,062	E85	310/540*
			14/19	\$1,688	Gas	410/690*

MERCURY						
Mountaineer 2WD	A-5	4.0/6	11/15	\$1,903	E85	290
			15/20	\$1,588	Gas	380

MINIVANS 2WD

CHRYSLER						
Town & Country 2WD	A-4	3.3/6	13/17	\$1,651	E85	300
			18/25	\$1,285	Gas	420

DODGE						
Caravan	A-4	3.3/6	13/17	\$1,651	E85	300
			18/25	\$1,285	Gas	420

SPORT UTILITY VEHICLES 4WD

CHEVROLET						
K1500 Avalanche 4WD	A-4	5.3/8	11/14	\$2,062	E85	310/490*
			14/18	\$1,688	Gas	410/620*
K1500 Suburban 4WD	A-4	5.3/8	11/14	\$2,062	E85	310/490*
			14/18	\$1,688	Gas	410/620*
K1500 Suburban AWD	A-4	5.3/8	11/14	\$2,062	E85	310/490*
			14/18	\$1,688	Gas	410/620*
K1500 Tahoe 4WD	A-4	5.3/8	11/14	\$2,062	E85	310/490*
			14/18	\$1,688	Gas	410/620*
K1500 Tahoe AWD	A-4	5.3/8	11/14	\$2,062	E85	310/490*
			14/18	\$1,688	Gas	410/620*

FORD						
Explorer 4WD FFV	A-5	4.0/6	11/15	\$2,062	E85	290
			14/20	\$1,688	Gas	380

GMC						
K1500 Yukon 4WD	A-4	5.3/8	11/14	\$2,062	E85	310/490*
			14/18	\$1,688	Gas	410/620*
K1500 Yukon AWD	A-4	5.3/8	11/14	\$2,062	E85	310/490*
			14/18	\$1,688	Gas	410/620*
K1500 Yukon XL 4WD	A-4	5.3/8	11/14	\$2,062	E85	310/490*
			14/18	\$1,688	Gas	410/620*
K1500 Yukon XL AWD	A-4	5.3/8	11/14	\$2,062	E85	310/490*
			14/18	\$1,688	Gas	410/620*

MERCURY						
Mountaineer 4WD FFV	A-5	4.0/6	10/14	\$2,062	E85	270
			14/19	\$1,688	Gas	380

STANDARD PICKUP TRUCKS 2WD

CHEVROLET						
C1500 Silverado 2WD	A-4	5.3/8	12/16	\$1,767	E85	310/540*
			16/20	\$1,501	Gas	410/690*

DODGE						
Ram 1500 2WD	A-5	4.7/8	9/11	\$2,475	E85	290
			12/15	\$2,076	Gas	340



California Methanol Program Experience: Importance of Accurate Consumer Advisories



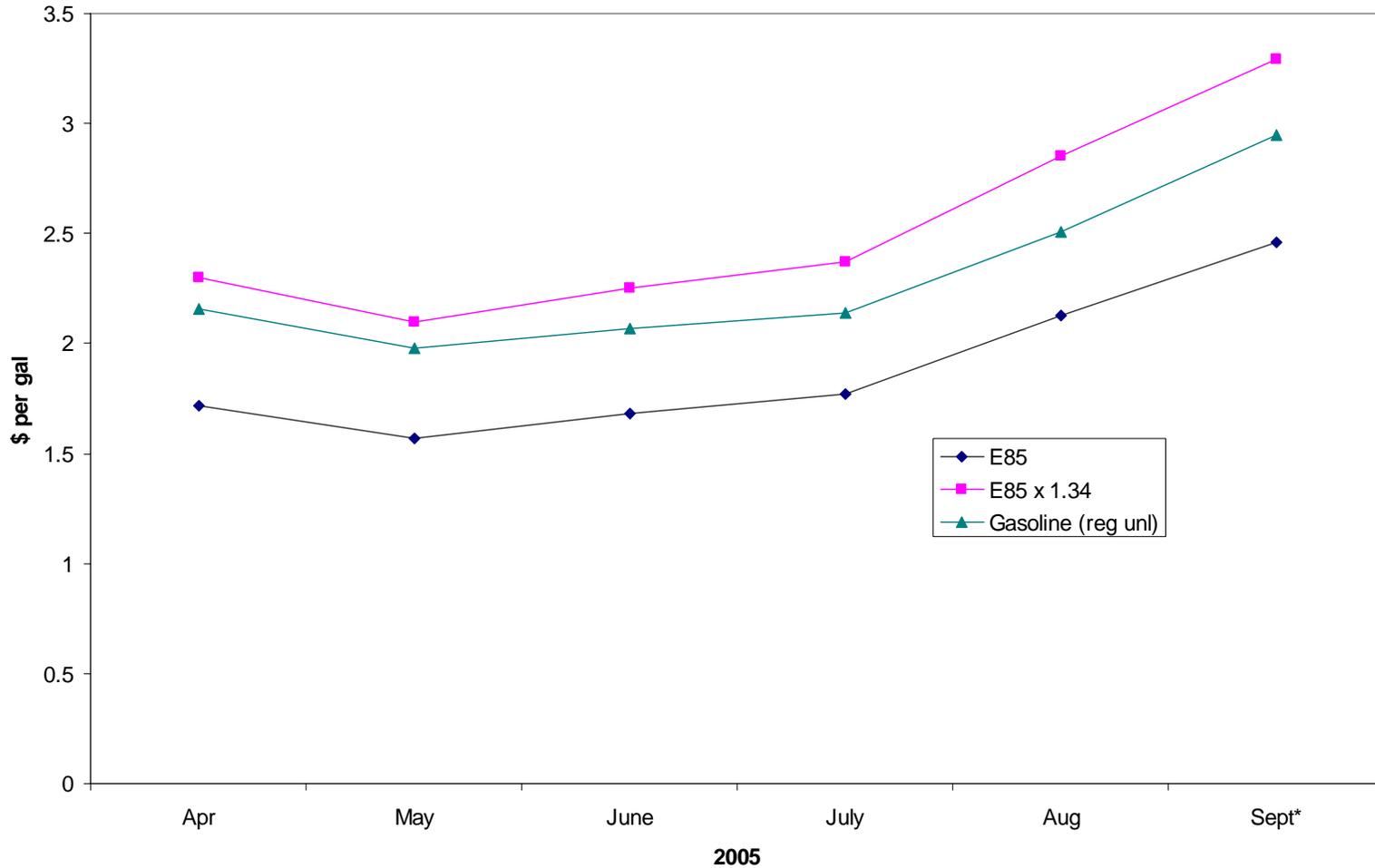
MULTIPLY METHANOL FUEL PRICE BY 1.7 TO COMPARE WITH GASOLINE PRICE.

The energy content of methanol fuel is less than gasoline. Therefore, it takes about 1.7 gallons of methanol fuel to equal one gallon of gasoline.

DCL381B



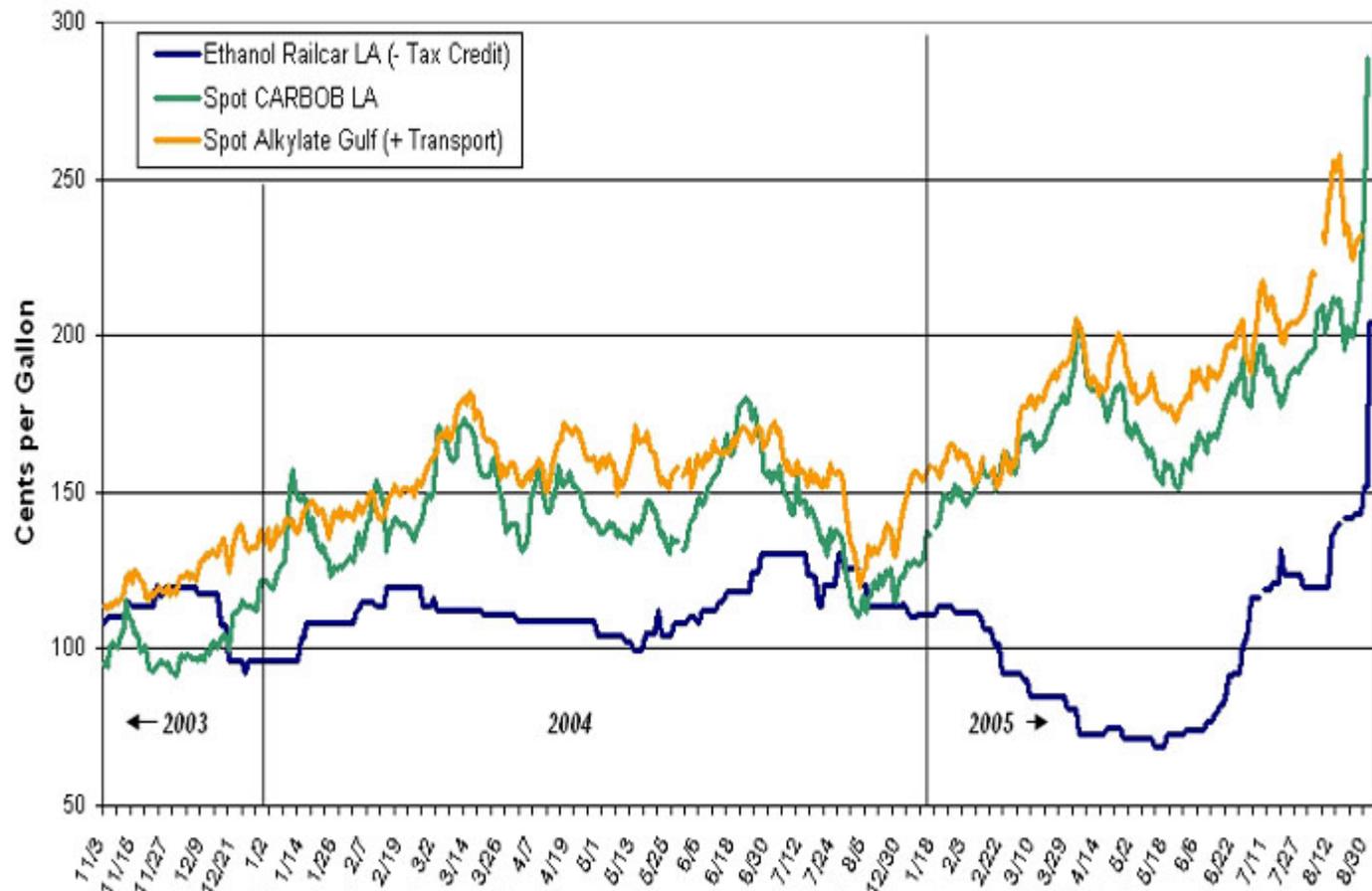
E85 vs Gasoline Prices Monthly Average of Survey-Reports



Data from: American Lung Assoc. of Minnesota "E85 Price Forum" (user-reported survey of prices at retail E85 stations in MN and other states); * Sept. 1-12



Recent California Reformulated Gasoline Blendstock Prices



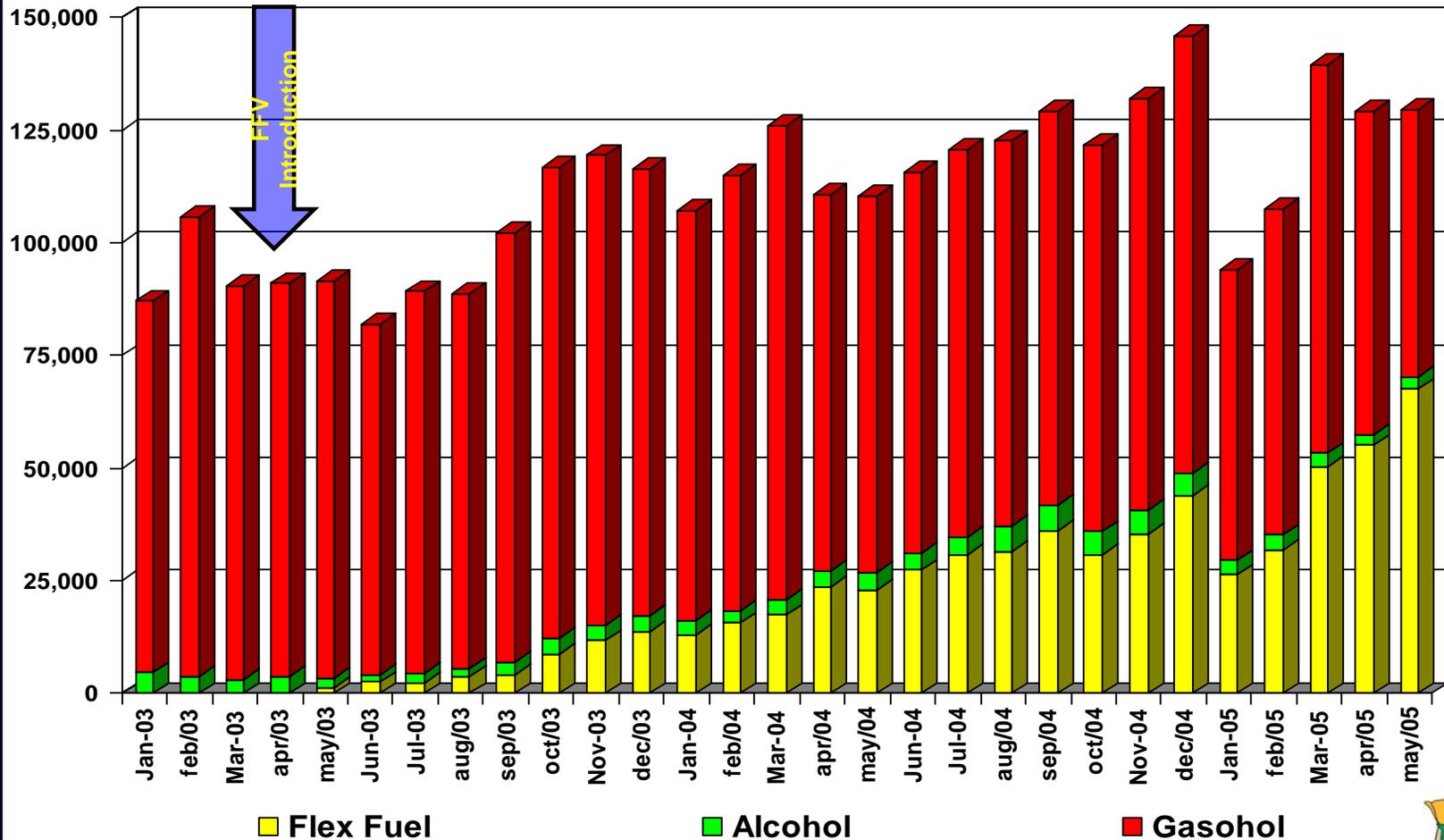
Notes: Ethanol railcar prices are from Platts, and are average prices for prompt Southern California shipments including 52 c/gal federal tax credit (51 c/gal after 1/1/05). California alkylate prices are calculated from Platts and include 20 c/gal transportation & distribution cost from Gulf Coast to California. Spot wholesale prices for regular-grade California reformulated gasoline blendstock for oxygenate blending (CARBOB) are from US Department of Energy. Data from 11/3/03 to 9/1/05.

CEC/TFO, Sept 2, 2005



Brazil -- FFV Market Share in Light Vehicles Sales

January 2003 to May 2005



Source: Brazilian Automotive Industry Association - ANFAVEA



Ethanol vs. Gasoline Pricing in Brazil

Brazil - Retail Hydrous R\$/ltr		
10-Sep-05	Value	Wk change
Cent. West	1.499	▲ 0.044
Nth East	1.753	▲ 0.051
North	1.882	▲ 0.055
Sth East	1.155	▲ 0.034
South	1.432	▲ 0.042
Average	1.544	▲ 0.045



Brazil - Retail Gasoline R\$/ltr		
10-Sep-05	Value	Wk change
Cent. West	2.536	▲ 0.199
Nth East	2.551	▲ 0.200
North	2.677	▲ 0.210
Sth East	2.377	▲ 0.186
South	2.609	▲ 0.204
Average	2.550	▲ 0.200

Avg. gasoline price is 1.66 x Avg. ethanol price

(Note: 1 Brazilian Real = 0.43 U.S. dollar)

Source of data: J Kingsman Ethanol; photo from Brazilian Automotive Industry Association - ANFAVEA



California Energy Commission Recommendations for E85

From: 2005 Integrated Energy Policy Report (Committee Draft – Sept. 2005*)

Establish a process to expand the use of E-85 in California by:

- 1) developing and certifying E-85-compatible fuel dispensing systems
- 2) implementing a process to expedite the permitting of E-85 stations
- 3) investigating the feasibility of requiring all or a portion of new cars sold in California to be FFVs
- 4) establishing a collaborative state/industry working group to identify fuel infrastructure changes needed to increase production and distribution of E-85 and prepare a strategic/business plan to exploit opportunities to incorporate E-85 into the existing retail fueling system
- 5) sponsoring a consumer notification and education program promoting the availability of FFVs and E-85 fuel
- 6) evaluating incentive programs in other states to determine their applicability and usefulness for creating an E-85 retail infrastructure in California
- 7) supporting research for the development of technologies to convert biomass resources to ethanol

* Full report on Energy Commission website at:

<http://www.energy.ca.gov/2005publications/CEC-100-2005-007/CEC-100-2005-007-CTD.PDF>

