

Unstudied Risks...
**Economic Assessment of Conversion From MTBE
to Ethanol in California**

Prepared for the American Methanol Institute

September 1999

MONITOR COMPANY

Amsterdam ■ Athens ■ Cambridge ■ Frankfurt ■ Hong Kong ■ Istanbul ■ Johannesburg

London ■ Los Angeles ■ Madrid ■ Manila ■ Milan ■ Moscow ■ Munich ■ New Delhi ■ New York ■ Paris

São Paulo ■ Seoul ■ Singapore ■ Stockholm ■ Tel Aviv ■ Tokyo ■ Toronto ■ Zurich

Copyright © 1999 by Monitor Company, Inc.

No part of this publication may be reproduced, stored in a retrieval system, or transmitted in any form or by any means —
electronic, mechanical, photocopying, recording, or otherwise — without the permission of Monitor Company.

Summary of Conclusions

- Even under conservative assumptions, **there is not enough ethanol to meet California's needs**
- **California will be short 6.1 billion gallons of oxygenated gasoline. This leaves California motorists with an 6.5 month supply of oxygenated gasoline in 2003**
- This shortfall would likely cause a **significant price spike**, (based on demand) **resulting in discriminatory and regressive pricing and/or long lines at the gas pump**
- Because ethanol will not be transported in pipelines; **in the first three years of the MTBE ban (starting in 2003) over 210,000 diesel truck trips will travel over 15 million miles on neighborhood streets and highways**
- **More than \$1 billion will be spent by refiners to retrofit their facilities; significant additional costs will be passed on to the consumer at the pump**
- **Additional distribution costs will be incurred** because ethanol arriving from the Midwest by rail and marine vessel will not be piped to terminal sites, but rather must be transported by diesel truck and rail
- The **most directly affected areas** in California will be those surrounding the various refineries, terminals and transloading facilities. These communities **have significantly higher ethnic populations and lower household incomes than most of California**

Contents of This Report

Background

Summary of Findings and Issues

Supply and Demand Scenarios

**Added Costs for Processing
and Distributing Ethanol**

**Environmental,
Health, and Safety Issues**

The Primary Objective of This Study Was to Assess the Economic Issues Related to the Switching From MTBE to Ethanol

Objectives

- Assess economic issues related to switching from MTBE to ethanol as a fuel oxygenate in California
 - Demand and supply characteristics
 - Distribution methods and costs in changing from a closed pipeline system to a diesel truck and rail system
 - Pricing considerations
 - Specific community impacts
 - Highway funding and subsidies
 - Ability to make switch by 12/31/02
- Highlight critical issues requiring further evaluation

Scope

- Scope was limited to the understanding of possible economic scenarios related to California's switch from MTBE to ethanol, and the likely implications and issues that result from each scenario

Secondary Information Sources Provided the Foundation for this Review ...

- California Energy Commission
 - “Supply and Cost Alternatives to MTBE in Gasoline”, October 1998
- Renewable Fuels Association
 - “Ethanol Industry Outlook for 1999 and Beyond”, 1999
 - “The Use of Ethanol in California Clean Burning Gasoline”, February 1999
- U.S. Census Bureau
- Department of Energy
 - Energy Information Administration
 - Office of Fuels Development
- Department of Transportation
 - Bureau of Transportation Statistics
 - Federal Highway Administration
 - TE-21 Transportation Equity Act for the 21st Century
 - Financing Federal Highways Publication
 - Primer for Highway Trust Fund
- PacTech Data & Research Inc.

... Supplemented By Discussions With Experts in Specific Areas Under Review

- California Energy Commission
 - Stephen Rhoads, *Former Executive Director*
 - Gordon Schremp, *Technical Project Manager*
 - Tom Glaviano, *Project Manager*
 - Pat Perez, *Project Manager*
- Federal Highway Administration
 - Dedra Goodman, *Office of Policy Development*
 - Carolyn Edwards, *Office of Policy Development*
- Institute of Environmental Policy Studies, UC Riverside
 - Nicole Hill, *Development Engineer*
 - Jim Lents, *Director*
- Lyondell
 - Larry Jenkins, *Rail and Truck Transportation*
 - Mike Bozelli, *Barge and Tanker Transportation*
- Legislative Analysts' Office, State of California
 - Rebecca Long, *Transportation Analyst*
 - Mark Ibell, *Taxation Analyst*
- California Coastal Commission
 - Allison Detmer, *Coastal Program Analyst*
- Bay Conservation and Development Commission
- Association of American Railroads; Transportation Tech. Center
 - Greg Conlon, *Director of Hazardous Materials Marketing*
 - Jim Jarvis, *Bureau of Compliance, Inspector*
- Benito, Inc. (Ethanol Tanker Truck Distribution)
 - Doug Hawkins, *Marketing Department*
- Air Resources Board
 - Alan Hirsch, *Information Officer*
- PacTech Data & Research Inc.
 - David Ely, *Director of Research*
- Burlington Northern Santa Fe
 - JR Nuñez, *Market Manager*
- American Commercial Barge Line
 - Liquid Sales Department
- Downstream Alternatives, Inc.
 - Bob Reynolds, *Consultant*
- Van G Trucking
 - Jack Tosi, *Sales Department*
- Kern Oil
 - Chad Tuttle, *Environmental Engineer*
- Renewable Fuels Association
 - Mary Wertsching, *Director of Communications*
- GATX
 - Nancy Uno, *Sales*
- Pervin & Gertz
 - John Vultrain, *Senior Consultant*
- Gas Processors' Association
 - Ron Brunner, *Technical Information*
- Dewitt and Company
 - Bill Richards, *Consultant*
- Union Tankcar
 - Scott Bowes, *Sales and Marketing*
- Citizens for Reliable and Safe Highways (CRASH)
 - Michael J. Scippa, *Executive Director*
- Oxygenated Fuels Association
 - Nick Economides, *Technical Director*

Background

Summary of Findings and Issues

Supply and Demand Scenarios

**Added Costs for Processing
and Distributing Ethanol**

**Environmental,
Health, and Safety Issues**

Several Key Questions Should Be Considered Before California Switches to Ethanol

Supply and Demand

- Is there enough supply of ethanol to meet near-term California demand?
 - What if New England (CT, ME*, VT**, RI, MA, NH) and Tri-States (PA, NY, NJ) switch as well?
 - What if there is a nationwide ban on MTBE?
- At what price would ethanol be made available under each of these scenarios?
- How will ethanol supply shortfalls affect pricing of ethanol?
- How much ethanol can be redistributed from other uses / markets and at what cost?
- How quickly can additional ethanol capacity be put on-line?
- What impact will there be from having a few large suppliers of ethanol as it relates to pricing, as well as timing of capacity expansions?
- Can enough ethanol be produced from biomass in California to meet demand?

Note: * Maine has already instituted a ban on MTBE; ** Vermont does not currently sell reformulated gasoline

Several Key Questions Should Be Considered Before California Switches to Ethanol (Continued)

Added Processing & Distribution Costs*

- What is the additional distribution cost associated with switching to a diesel truck and rail system from a closed pipeline system?
- What is the additional capital expenditure for retrofitting existing refineries and terminals?
- How much of the total added base cost will be passed through to the consumer?

Environmental, Health and Safety

- How many more diesel trucks and rail cars will be needed?
- How much additional pollution will this create?
- How many more accidents and traffic congestion will result?
- What is the impact on California highways as a result of increased truck traffic?
- Given that ethanol will not be piped, what neighborhoods will be impacted by ethanol distribution logistics?
- How much additional pollution is produced from the resulting higher vapor pressure mixture of ethanol blended and non-ethanol blended gasoline?

Note: * Excludes the cost of ethanol

Several Key Questions Should Be Considered Before California Switches to Ethanol (Continued)







Time Frame for Switching to Ethanol

- Is it realistic to convert to ethanol by December 31, 2002?
- What is the likelihood of terminals and refineries retrofitting and ethanol plants adding capacity before clear legislative direction?
- What other factors could make this oxygenate switch date unattainable?

Highway Funding and Subsidies

- What is the impact on the federal highway account resulting from the switch to ethanol, especially if there is a nationwide ban of MTBE?
- How will the public feel about subsidizing ethanol use as a gasoline additive in California?

There Are Six Significant Differences Between MTBE and Ethanol Use

Difference	Implications	
<ul style="list-style-type: none">• Unlike MTBE, ethanol will not be piped because of technical difficulties and excessive costs		<ul style="list-style-type: none">• Significant added rail and truck distribution required• Blending of gasoline will occur at each terminal rather than at the refinery
<ul style="list-style-type: none">• MTBE is mixed at 11% volume per gallon of gasoline vs. ethanol which is mixed at 5.7% volume		<ul style="list-style-type: none">• Additional alkylate production and other blending components are required to make up the volume
<ul style="list-style-type: none">• Ethanol supply is largely domestic and highly concentrated with major Midwest corporations		<ul style="list-style-type: none">• Potential for oligopolistic pricing• Capacity expansion may not occur in timely manner given control of the market and ability to raise prices• Added distribution costs
<ul style="list-style-type: none">• Ethanol has a higher Reid vapor pressure than MTBE		<ul style="list-style-type: none">• Gasoline blend stock must be altered, requiring retrofitting at refineries to adjust for volatility
<ul style="list-style-type: none">• Ethanol has Federal and state subsidies		<ul style="list-style-type: none">• Federal subsidies will be part of the cost of switching to ethanol; the greater the use of ethanol the greater the subsidy
<ul style="list-style-type: none">• When ethanol blended gasoline commingles with non-ethanol blended gasoline, the commingled fuel has a higher vapor pressure		<ul style="list-style-type: none">• Increased pollution in the form of VOCs (Volatile Organic Compounds). VOCs react with NOx and sunlight to produce ozone.

Supply Shortfalls Are Likely in the Near Term, and Will Put Upward Pressure on Prices or Cause Gasoline Shortages

Supply Scenarios

- Only California switches to ethanol by 12/31/02
California supply shortfall (2003) = 352 million gallons of ethanol or 6.1 billion gallons of oxygenated gasoline
Monthly oxygenated gasoline supply available to California (2003) = **6.5 months**
- California switches to ethanol by 12/31/02 and New England / Tri-State switches at 12/31/03
California supply shortfall (2004) = 562 million gallons of ethanol or 9.9 billion gallons of oxygenated gasoline
Monthly oxygenated gasoline supply available to California (2004) = **3.3 months**
- California switches to ethanol at 12/31/02 and rest of nation switches at 12/31/03
California supply shortfall (2004) = 714 million gallons of ethanol or 12.5 billion gallons of oxygenated gasoline
Monthly oxygenated gasoline supply available to California (2004) = **1 month**

Implications

- There is the potential for significant price increases to facilitate supply-demand balancing throughout the 2003 to 2005 time period
- While it is possible that new ethanol plants will be built, it is not clear whether timely capacity additions will provide more profit for the few player who have substantial control of this market than significant price increases
- Although there is potential for redirection of ethanol from other markets/uses, redirection will necessitate price increases in both fuel ethanol and the uses from which ethanol is redirected

Background

Summary of Findings and Issues

Supply and Demand Scenarios

**Added Costs for Processing
and Distributing Ethanol**

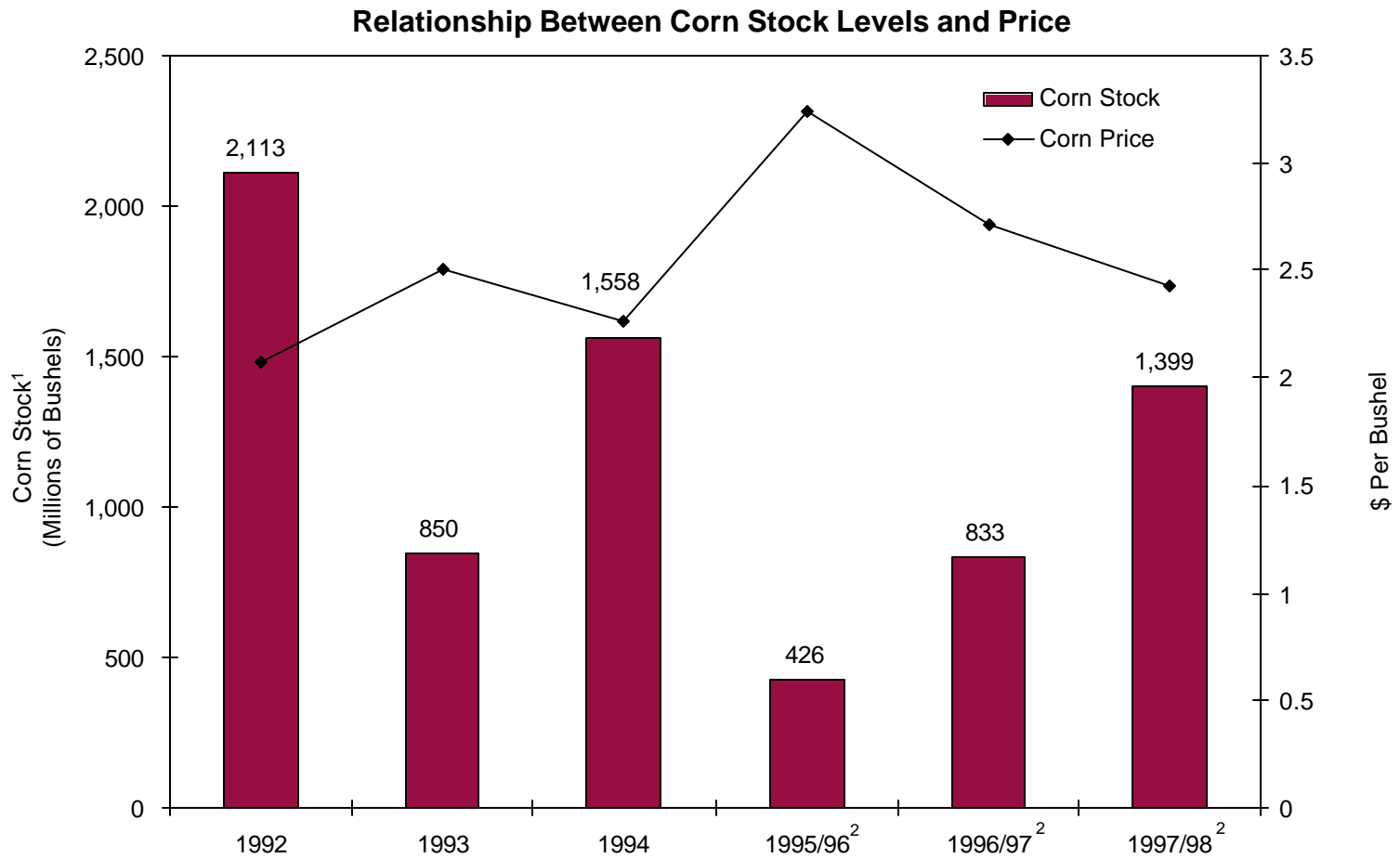
**Environmental,
Health, and Safety Issues**

Summary of the Unstudied Risks Associated with Supply and Demand

- How volatile are corn feed stock levels? What is be the potential impact of sequential drought years?
- What are the operational difficulties for ethanol producers to move from current 76% capacity utilization to 95% capacity utilization?
- How feasible is it to redirect ethanol from other markets/uses to meet potential ethanol supply shortfalls in California and nationwide? How long will it take? What are the price implications?
- Is there an opportunity to supplement domestic ethanol supply with consistent and reliable imports?
- How concentrated is ethanol production? What effect does this have on capacity expansion (amounts and timing) and the price of ethanol?
- Can California develop biofuel alternatives (with aggressive investment) to help offset potential ethanol supply shortfalls and reduce cost to end consumers?

Even if **only** California switches to ethanol, an ethanol supply shortfall is likely; should other states follow California's lead, the shortfall could be severe

Corn Production Volatility Has Resulted in Price Swings in Corn of More Than 50% Over a Six Year Period



Note: ¹ Stock at end of time period

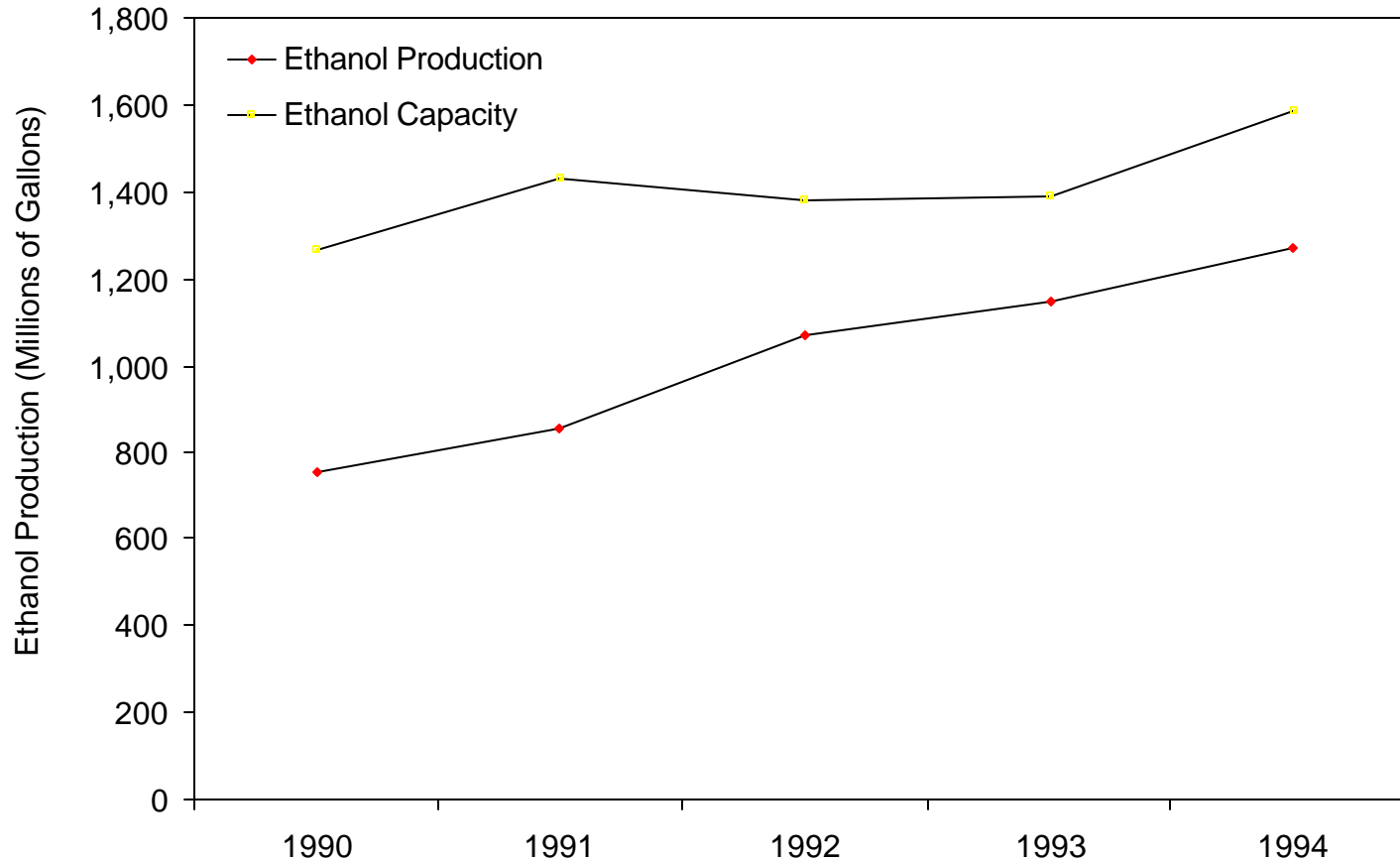
² Adjusting for date

Source: USDA, World Perspectives, Inc. October 1998 and National Agricultural Statistics Service

The First Source of Ethanol for Increased California Demand Will Be Current Excess Capacity at Ethanol Plants

- Ethanol manufacturers have not exceeded 85% operating capacity in *any* period in the 1990's for which data is available
- Assumed manufacturers can reach 95% capacity resulting in 19% excess capacity available (current capacity at 76% in 1999)

Ethanol Production Capacity versus Average Annual Production



% of Capacity

59%

60%

78%

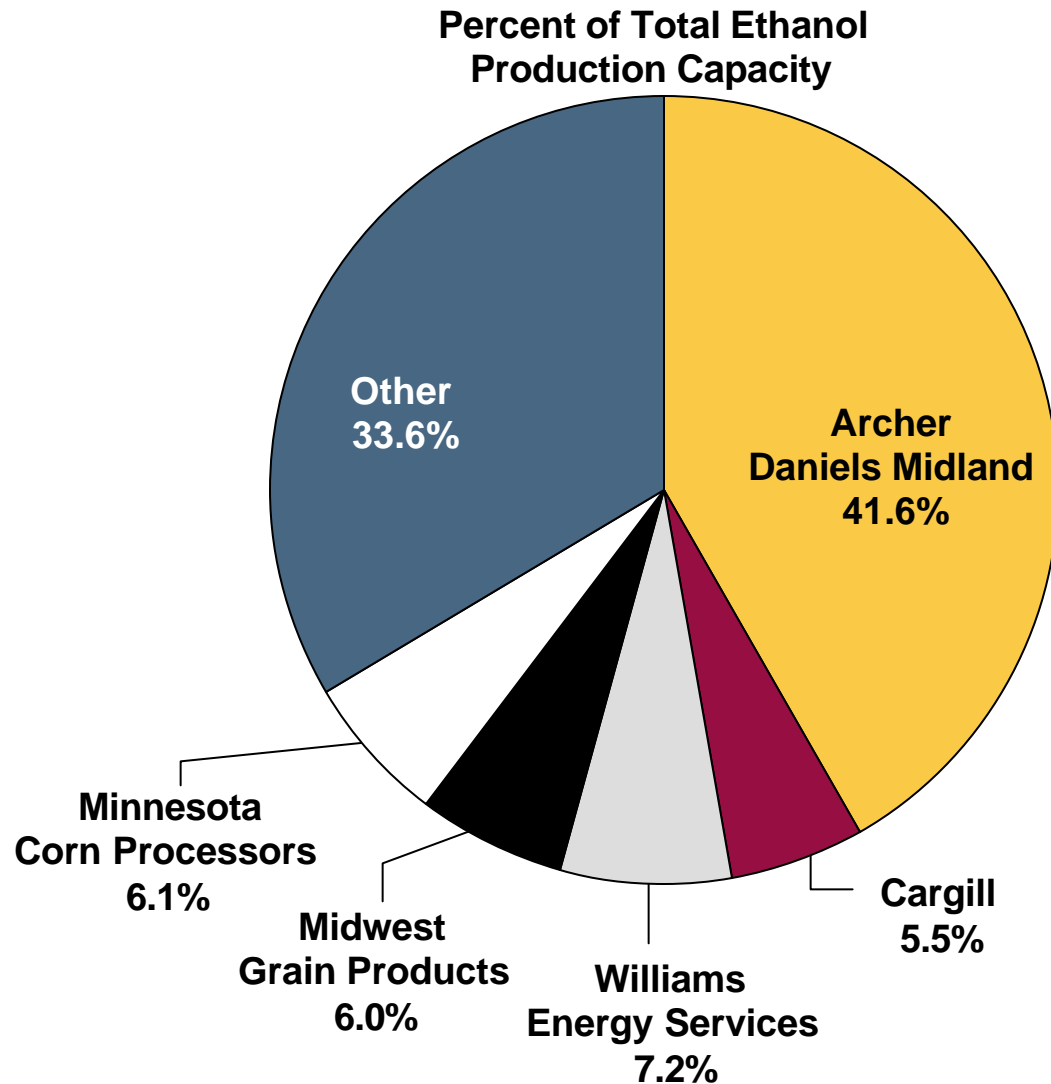
83%

80%

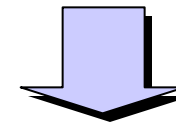
Note: US DOE, EIA stopped collecting production capacity after Jan. 1 1995

Source: US DOE, EIA, <http://www.eia.doe.gov/emeu/steo/pub/special/oxy1.html#Table3>, Bryan and Bryan, Inc.

In Addition, The Largest Five Ethanol Manufacturers Account for More Than 66% of All Ethanol Production



- ADM has 4 ethanol plants with an average capacity of 193 million gallons of ethanol per year
- “Others” include 44 ethanol plants in the United States with an average capacity of 14 million gallons of ethanol per year



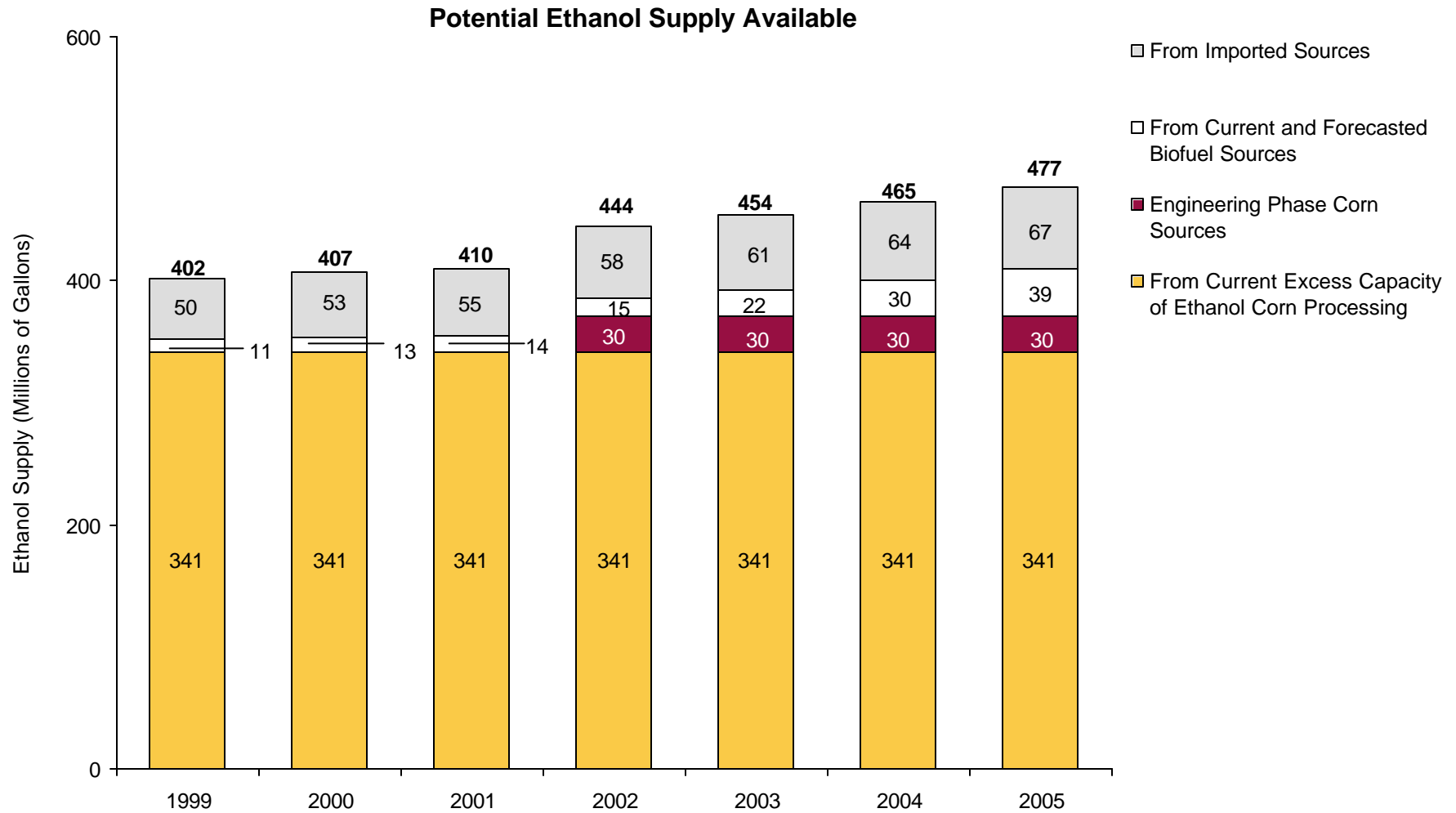
- Excess capacity will likely come from the larger ethanol plants: ADM, Cargill, Williams Energy, Midwest Grain Products, and Minnesota Corn Processors.

Note: Any facility with corn as a feedstock was included in the corn category

Source: Renewable Fuels Association 1999 Industry Outlook, Wall Street Journal 7/12/99, New York Times 8/15/99

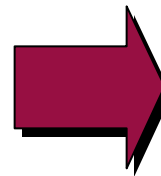
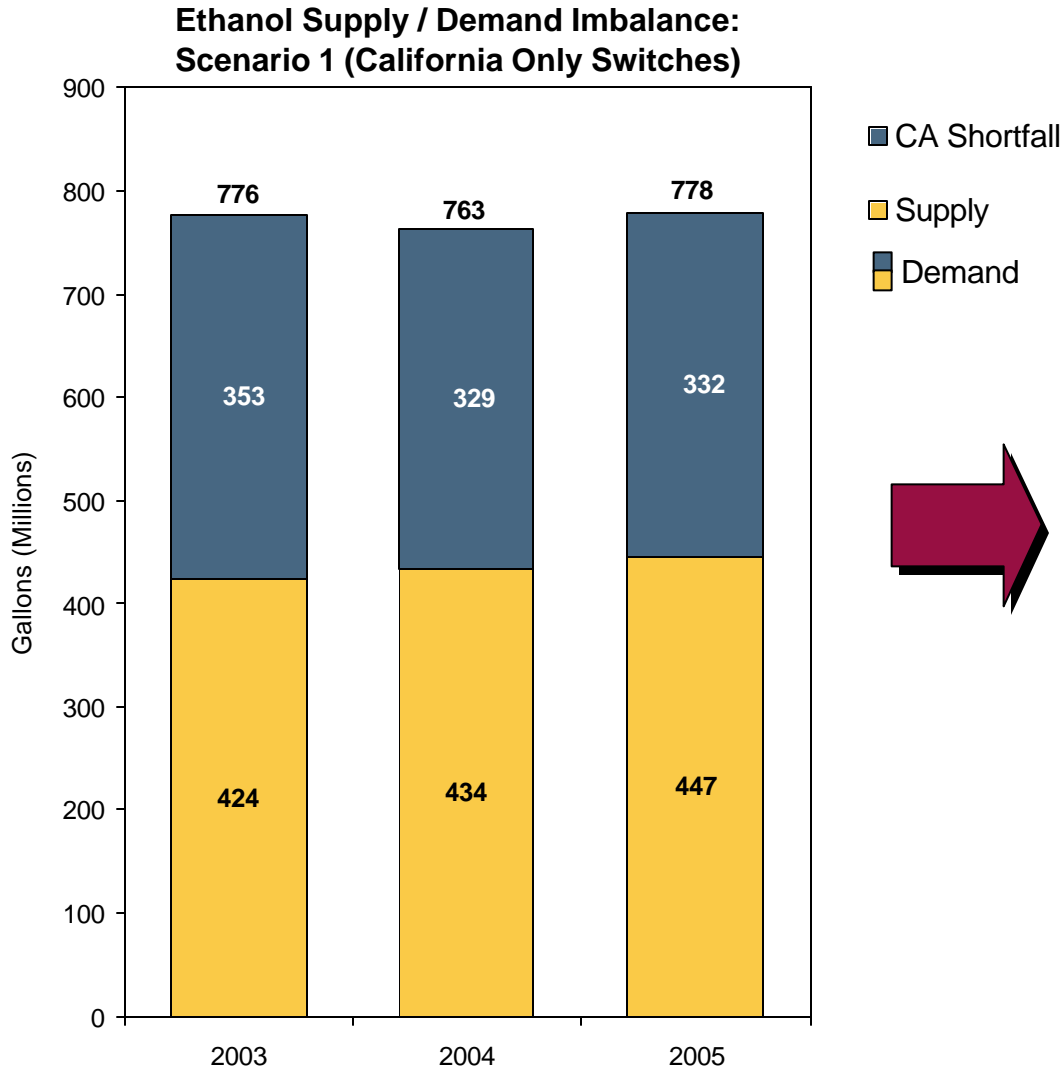
Supply of Ethanol That Could Be Available to California Is Expected to Grow at 4% Compounded Annual Growth Rate

- Additional plants are in planning phase; these plants have not been included in supply forecasts because of the uncertainty of approvals, permitting, construction dates, and plant use



Note: All plants that come on-line after 2000 will operate at 95% of capacity
 Source: California Energy Commission

Based on Current Supply Sources, An Ethanol Shortfall Exists Even If Just California Switches to Ethanol



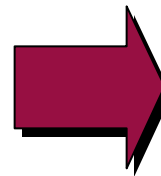
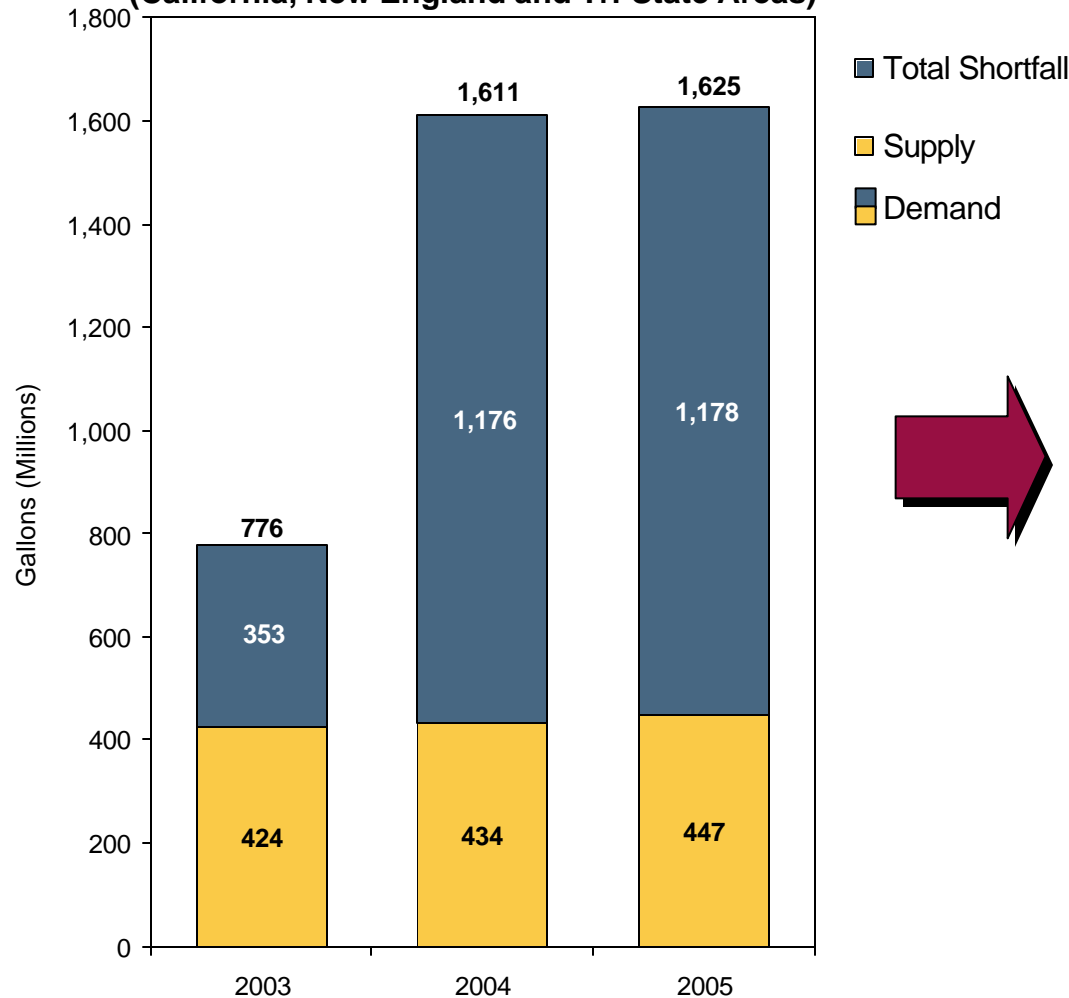
Implications

- 25% of ethanol currently used in other markets (i.e., beverages, industrial, fuel) would need to be redirected at a price premium to eliminate the California shortfall
- The California shortfall decreases by 30 million gallons or 9% if plants currently in engineering become operational by January 1, 2003 and 100% of their ethanol is directed to California

Note: Supply scenarios assume no prolonged droughts occur
Source: Monitor Analysis

The Shortfall Increases If New England (CT, ME, MA, NH, RI, VT) and the Tri-States (PA, NY, NJ) Also Switch to Ethanol

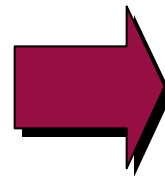
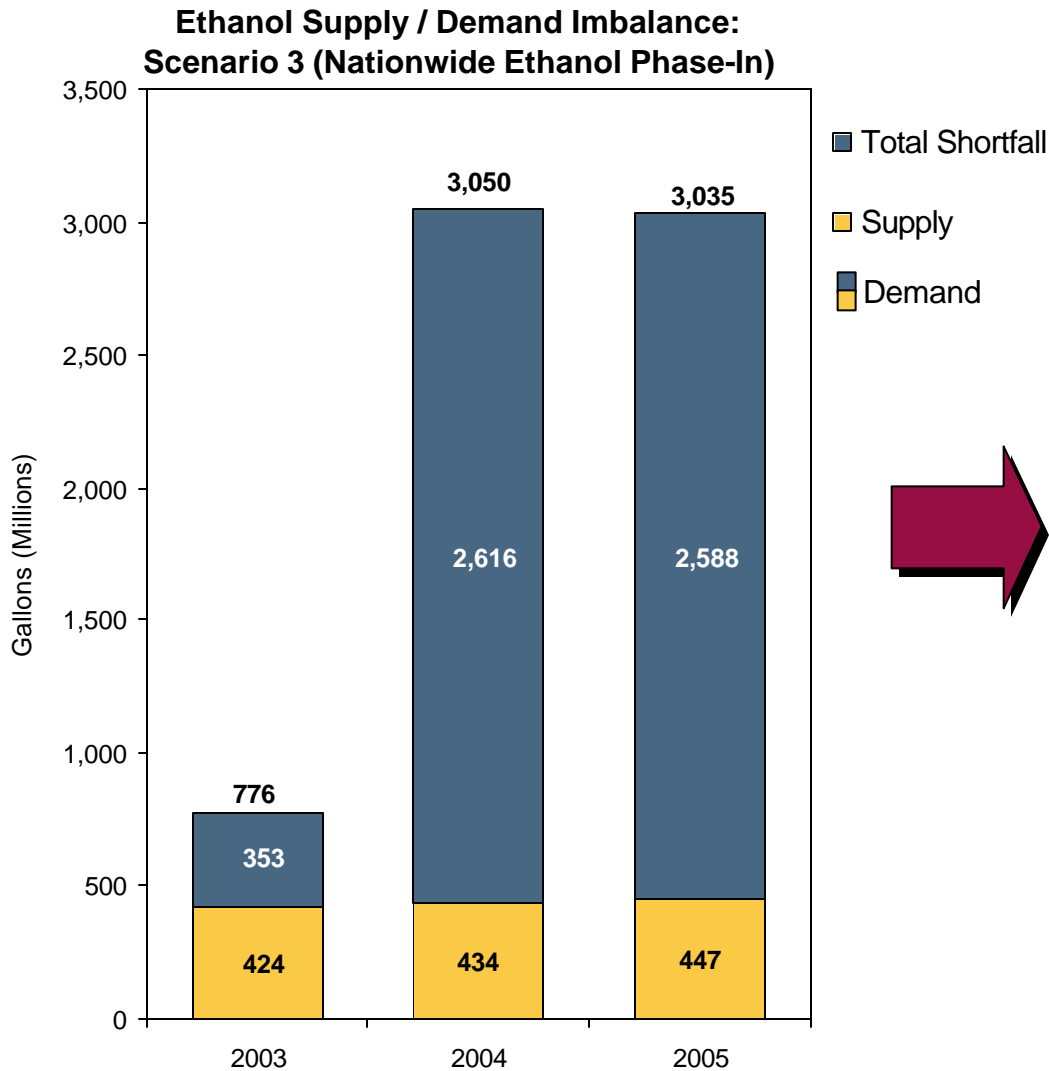
**Ethanol Supply / Demand Imbalance: Scenario 2
(California, New England and Tri-State Areas)**



Implication
<ul style="list-style-type: none"> • 41% of ethanol currently used in other markets (i.e., beverages, industrial, fuel) would need to be redirected at a price premium to eliminate the California shortfall in 2004 • 84% of ethanol currently used in other markets would need to be redirected at a price premium to eliminate the California, New England, and Tri-State shortfall in 2004

Note: Other states phase-in ethanol by January 1, 2004; supply scenarios assume no prolonged droughts occur
 Source: Monitor Analysis

...If the Whole Nation Switches, Ethanol Shortfall Equals 83% of Demand In 2005



Implications

- 52% of ethanol currently used in other markets (i.e., beverages, industrial, fuel) would need to be redirected at a price premium to eliminate the California shortfall in 2005
- Even if all ethanol currently used in other markets were redirected, there would still be a shortfall nationwide in 2004
- An increase in corn production would likely be required to meet the ethanol shortfall of the entire nation (assuming minimum corn stock must be maintained); the cost implications of this (adding distribution capacity, etc.) and the resulting price implications could be extreme

Note: Other states phase-in ethanol by January 1, 2004; supply scenarios assume no prolonged droughts occur
 Source: Monitor Analysis

To Address the Projected Shortfall, Ethanol Producers Would Have to Spend Between \$600 Million and \$2.6 Billion on Plant Expansion

- Whether or not appropriate labor and equipment could be sourced in the necessary time and at a reasonable price cannot be determined
- Without legislative and/or regulatory certainty, it is unlikely that the necessary capacity expansion will occur

	Scenario #1: California Only 2003	Scenario #2: California , New England/ Tri-State 2004
Forecast Ethanol Shortfall	353M Gallons	1,176M Gallons
Assumed Average New Ethanol Plant Capacity	15M Gallons	15M Gallons
Additional Plants Required at 85% Capacity Utilization	28	92
Cost to Build One Plant*	\$30M	\$30M
Total New Plant Cost to Eliminate Shortfall	\$840M	\$2,760M

Source: *American Petroleum Institute, Monitor Analysis

Moreover, the Key Assumptions Behind the Supply and Demand Calculations Are Conservative; There Could Be an Even Greater Shortfall

Monitor Study Assumption	Variation in Assumption	Increase in CA Ethanol Shortfall (2003)	Increase in Oxy Gasoline Shortfall (2003)
		Scenario 1: CA Only	Scenario 1: CA Only
Ethanol is 5.7% of gasoline by volume	Ethanol percentage could be as high as 10%	+173% +542 M Gallons	+10,702 M Gallons
Ethanol Plants Operate at 95% Capacity	Plants can only reach 85% capacity	+52.7% +186 M Gallons	+3,263 M Gallons
Gasoline demand is grown at 2.0% per year	Demand grows at historical gasoline rates of 2.6%	+7.9% +28 M Gallons	+491 M Gallons
Alternative vehicle demand does not grow after 1998	Alternative vehicle demand continues to grow at 30% per year	+1.1% +4 M Gallons	+70 M Gallons

- There would be a price premium resulting from a shift in any of the above variables --- the size of the price premium is difficult to predict

And, While the Impact on Gas Prices of an Ethanol Supply Shortfall Cannot Be Determined, Anecdotal Evidence Indicates That It Could Be Substantial

Years	Change in Oil Supply	Change in Gasoline Price	Situation
1973-1974	-1.9%	+25.5%	<ul style="list-style-type: none"> October 1973: OPEC declares an embargo on oil exports to the US
1978-1979	-5.1%	+25.0%	<ul style="list-style-type: none"> January 1979: Saudi Arabia announces drastic cut in 1st quarter production November 1979: Iran takes Western hostages; US ceases imports from Iran
May 1999	-12.0%*	+47.0%*	<ul style="list-style-type: none"> February: Tosco Corp. refinery fire March: Chevron Corp. refinery fire

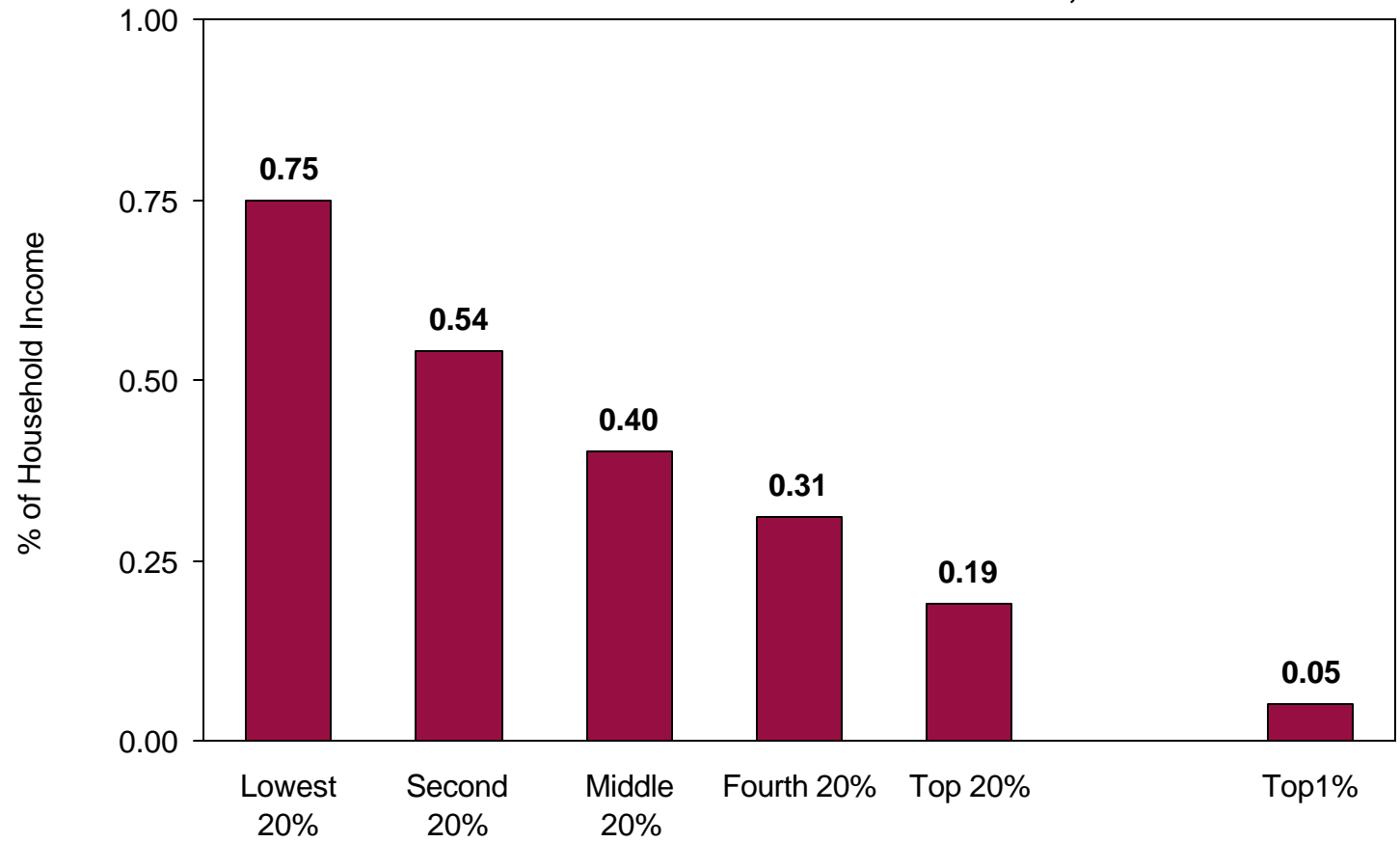
- The price increases in 1974 and 1979 reflected the uncertainty about supply; in retrospect, total supply changed very little during these years
- Price increase in 1974 were limited by price controls imposed
- The price increases in California in 1999 were more in line with lost supply because of the certainty of re-establishment of supply within a short period of time

Note: * California markets only

Source: U.S. Department of Energy, Dow Jones Business News, Monitor Analysis, California Energy Commission

Gasoline Price Increases Are Regressive; the Lowest 20% of Households by Income Would Pay 15 Times More Than the Top 1% of Households

Distributional Effects of Gasoline Excise Tax, 1995



Average Yearly Income	\$12,600	\$31,600	\$48,600	\$67,400	\$172,200		\$1,009,000
------------------------------	----------	----------	----------	----------	-----------	--	-------------

Source: California State and Local Taxes in 1995, California Budget Project

Background

Summary of Findings and Issues

Supply and Demand Scenarios

**Added Costs for Processing
and Distributing Ethanol**

**Environmental,
Health, and Safety Issues**

Summary of Unstudied Risks Related to Added Costs* for Processing and Distribution of Ethanol

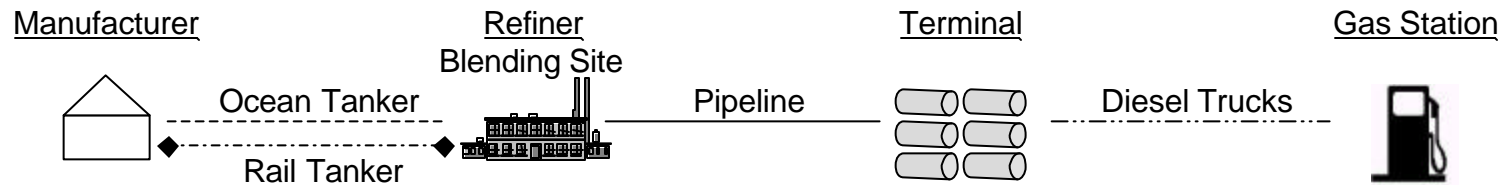
Due to conversion from a pipeline system to a rail / truck distribution system, as well as a different supply location (the Midwest), there will be additional costs to California consumers

- How many terminals will have rail capability added? When?
- How much retrofitting will be required at each refinery / terminal?
- What are realistic timeframes for retrofitting programs to be completed, especially given:
 - CEQA Issues
 - Permitting issues
 - Lawsuits
 - Availability of skilled contractors / engineers

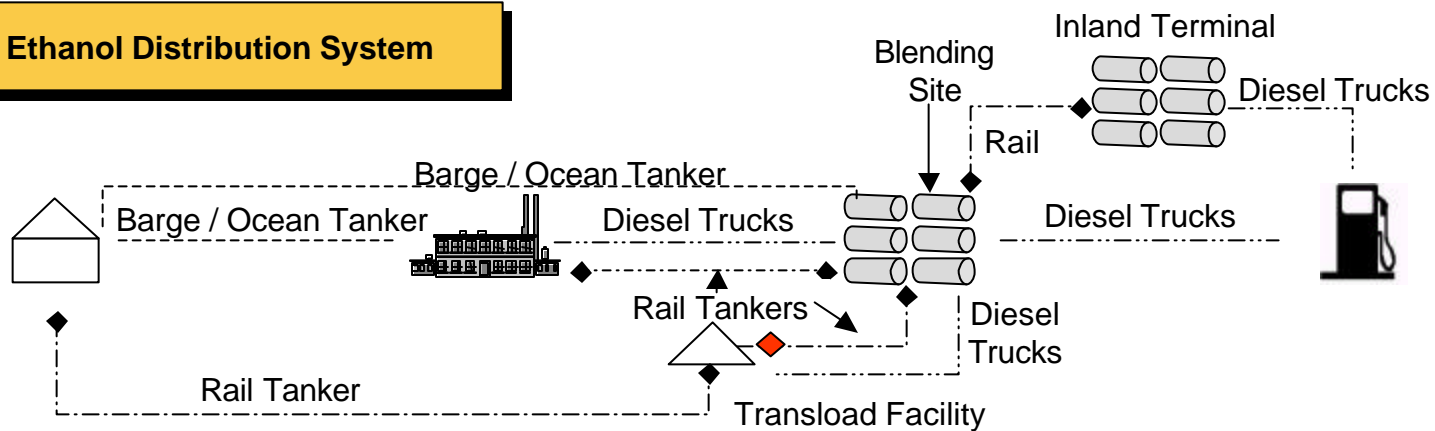
*Does not include price of ethanol

There Are a Number of Important Differences in the Distribution Systems for MTBE and Ethanol

MTBE Distribution System

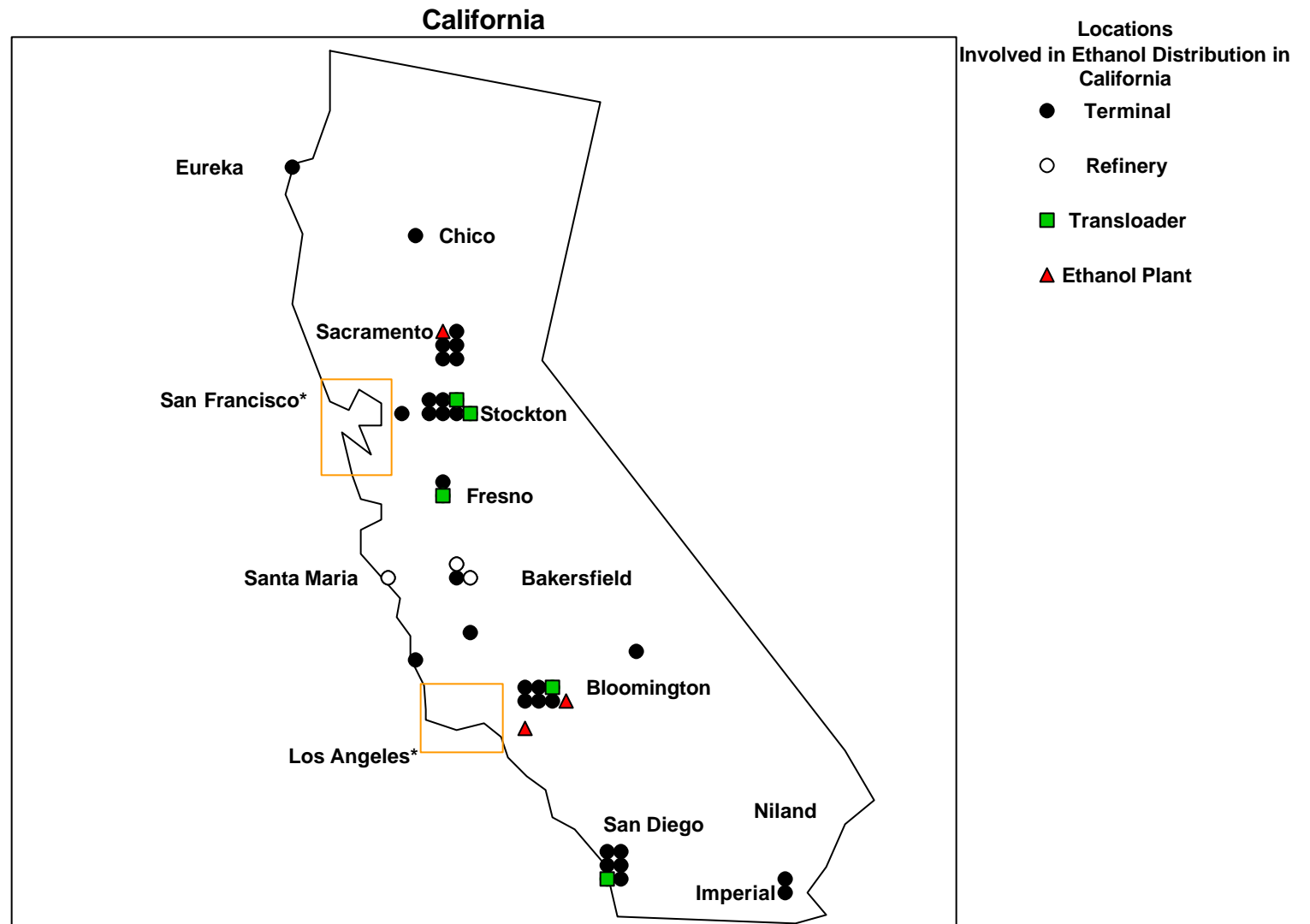


Ethanol Distribution System



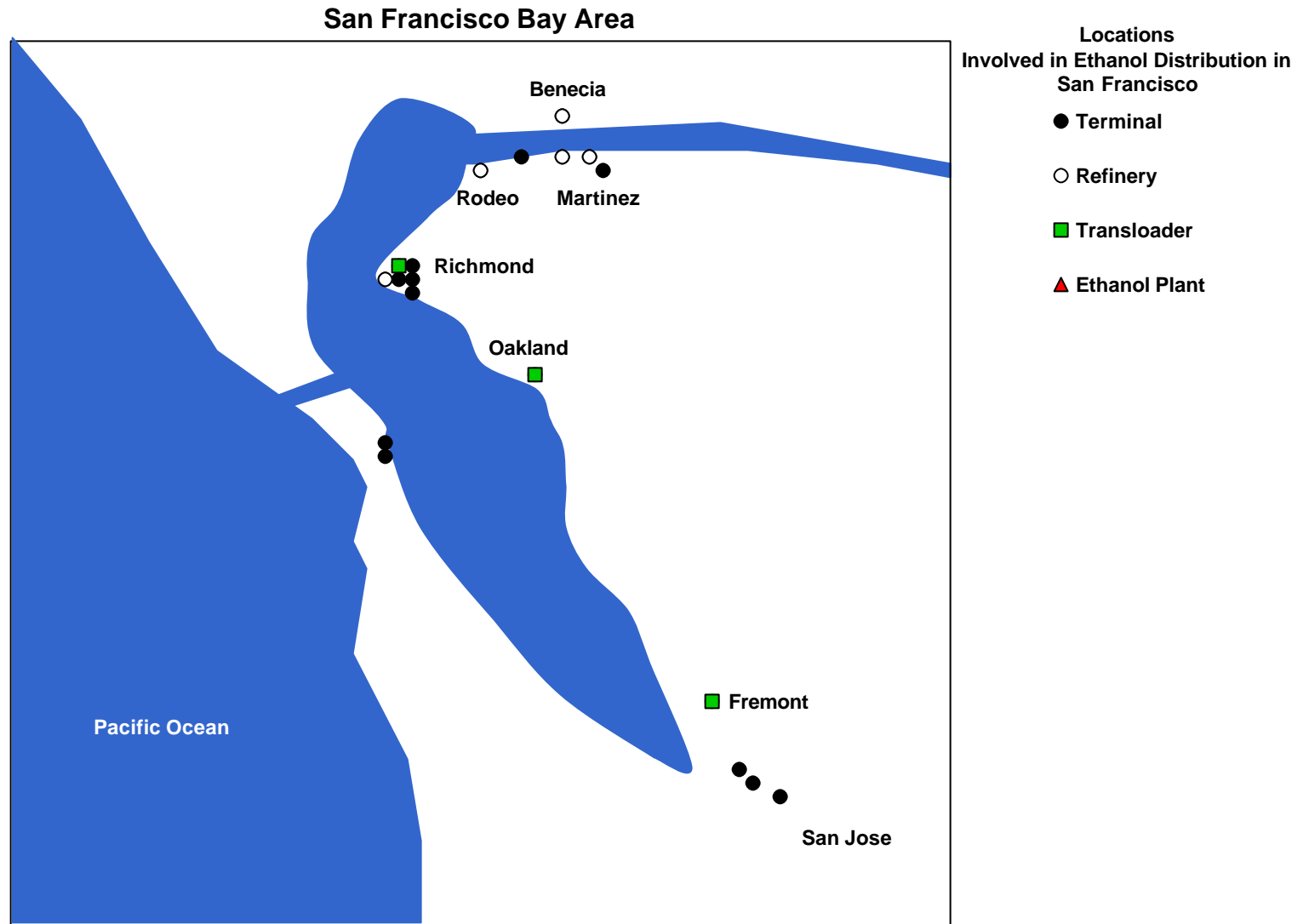
- Blended ethanol cannot be piped from refiner to terminals and therefore, will be transported by rail and truck in California
- Ethanol blending occurs at terminals and refineries
- Ethanol must be railed through a transload facility if it comes from the Midwest via rail
- Ethanol arriving by barge / marine at a coastal terminal may be redistributed to other tank farms in the state by rail or truck

Terminals, Refineries, and Transloader Facilities in California Are Concentrated in the San Francisco Bay and Los Angeles Areas



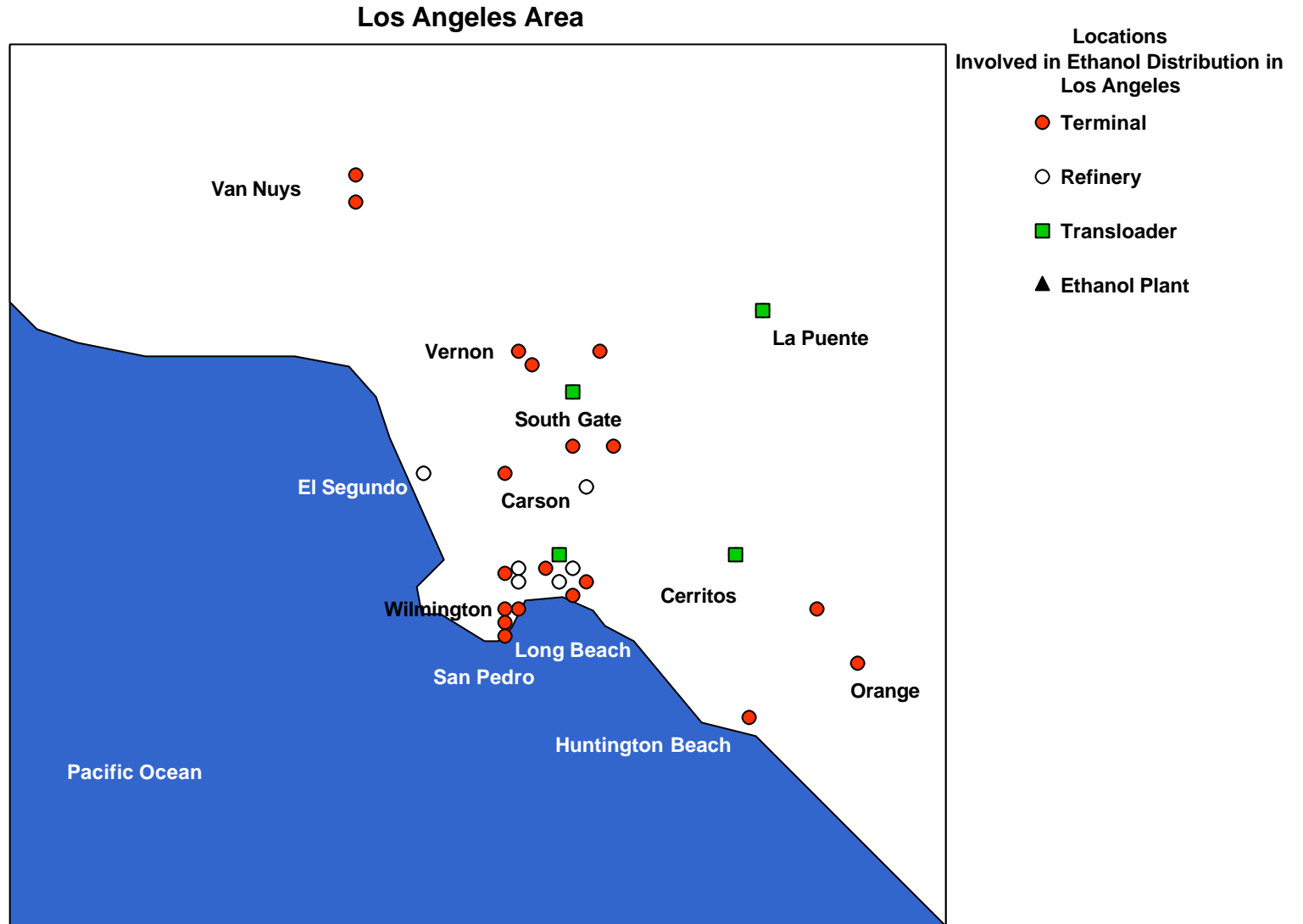
Note: *Enlargements of the San Francisco and Los Angeles areas follow
Source: OPIS Petroleum Terminal Encyclopedia (1999 edition), Monitor Analysis

The San Francisco Bay Area Has 26 Facilities; This Area Is Dominated by Coastal Refineries and Terminals



Source: OPIS Petroleum Terminal Encyclopedia (1999 edition), Monitor Analysis

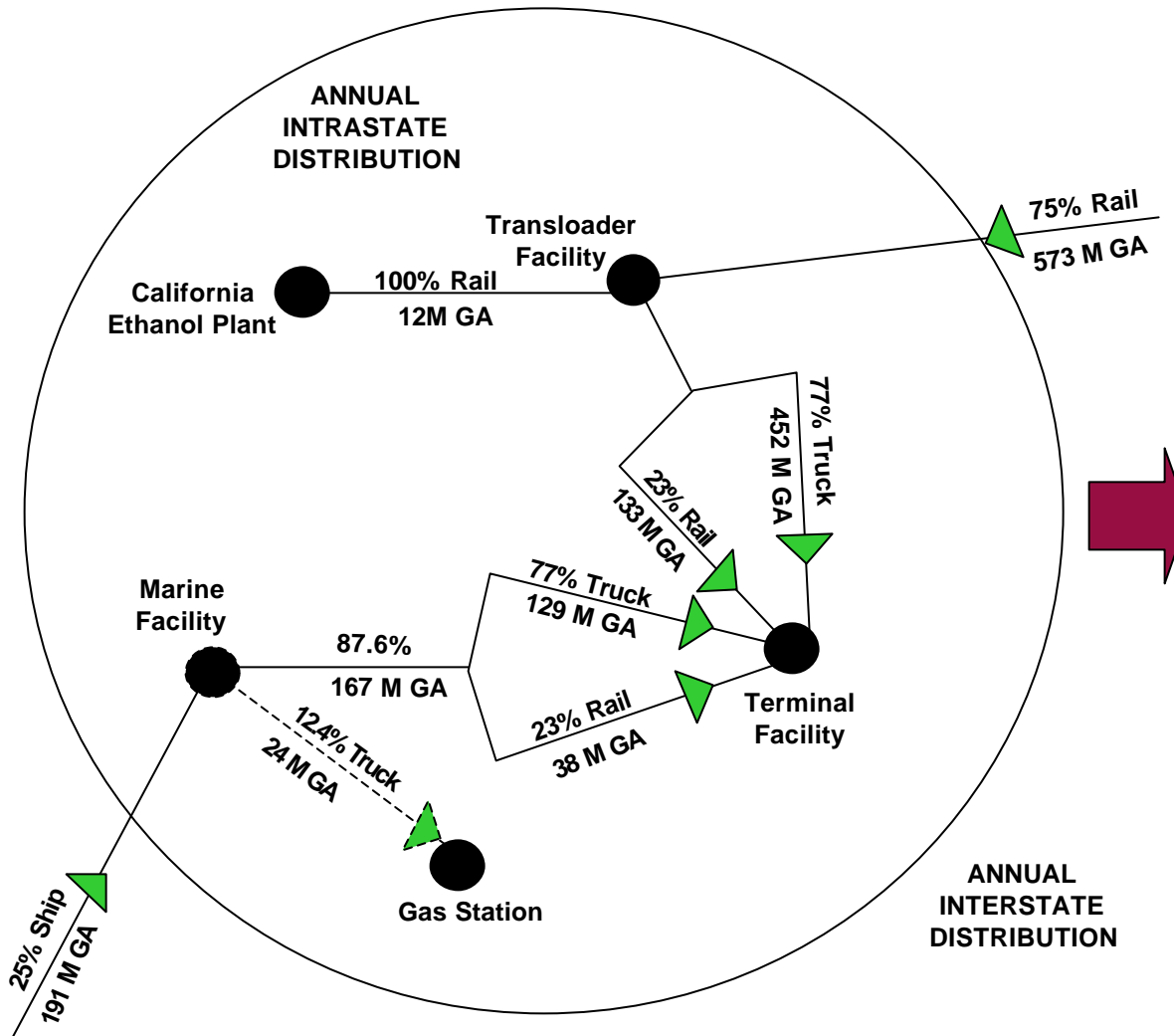
Of the 36 Facilities in Los Angeles, The Highest Concentration Is Found in San Pedro, Wilmington, and Carson



Source: OPIS Petroleum Terminal Encyclopedia (1999 edition), Monitor Analysis

More Ethanol Will Be Distributed by Ship, Rail, and Truck Intrastate Than MTBE Because Ethanol Will Not Be Piped

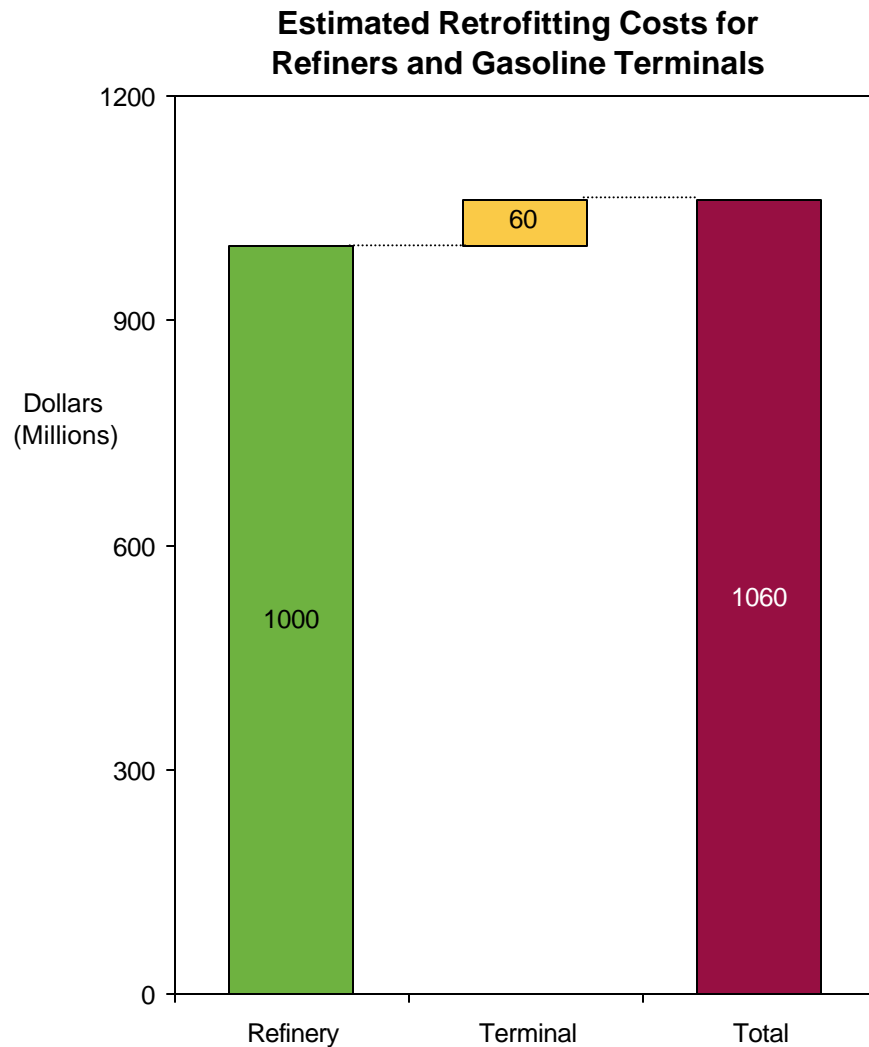
Assumed Added Ethanol Distribution Flow (2003)



Annual Intrastate Distribution Summary	
•	776 million gallons of additional ethanol will be distributed within California in 2003
•	24 million gallons of ethanol will go directly from marine terminals to gas stations (in the form of blended gasoline)
•	752 million gallons of ethanol will be distributed through transloaders or directly to terminal facilities using truck or rail
•	581 million gallons will be transported via truck to terminal facilities
•	171 million gallons will be transported via rail to terminal facilities

Note: Excludes ethanol that is already being used in California before a switch to MTBE
 Source: California Energy Commission

In the Long Term, the Vast Majority of Capital Expenditure (About \$1 Billion) Will Occur at the Refinery



Cost Categories
<ul style="list-style-type: none">• Refinery Modifications<ul style="list-style-type: none">– Adding alkylate and other gasoline blending stock capacity– Fractionation columns– Storage tank modification / addition• Terminal Modifications<ul style="list-style-type: none">– Diesel truck loading / unloading facilities (15% of total)– Rail access (17% of total cost)– Storage tanks (26% of total cost)– Sequential blending units (42% of total cost)

Source: California Energy Commission, Kern Oil

Several Tax Subsidy and Highway Funding Issues Also Need to Be Considered

- The Federal government could pay over \$300 million more per year in subsidies that ultimately go to ethanol producers to support California's conversion from MTBE to ethanol
- The Federal Highway Trust Fund is most affected if a **nationwide** switch to ethanol occurs:
 - A California only switch to ethanol results in a \$2.1 billion reduction in the Federal Highway Trust Fund over the next 6 years, reducing the fund surplus
 - A nationwide switch to ethanol would result in a \$8.4 billion reduction over the same time period
- California, however, does not experience a near-term reduction in its allocation of Federal Highway Trust Funds because of the way the program is structured today

Background

Summary of Findings and Issues

Supply and Demand Scenarios

**Added Costs for Processing
and Distributing Ethanol**

**Environmental,
Health, and Safety Issues**

Summary of Unstudied Risks Related to Environmental, Health and Safety Issues Caused by a Switch to Ethanol

- How many tons of particulate matter will be emitted per year from the additional diesel trucks and locomotives required to transport ethanol?
- How many tons of NOx gas will be emitted per year from these diesel trucks and locomotives?
- How many accidents and how much traffic congestion will be caused by the increased truck and rail traffic?
- How will refineries manage the excess butane and pentane removed from gasoline blend stock?
- Will communities in areas surrounding refineries, terminal and transloading facilities bear a disproportionate share of pollution and health risk?

In Addition to Increased Costs, Trucks and Rail Distribution Will Result in Increased Pollution and Traffic

Description

Between 2003 and 2005:

- Between 71,000 and 72,800 additional diesel truck trips will be made per year
- The additional number of diesel trucks will drive between 5.0 and 5.1 million miles per year
- Between 5,700 and 5,800 rail tanker trips will be taken per year
- These routes will be heavily concentrated in the Los Angeles Metropolitan and San Francisco Bay areas

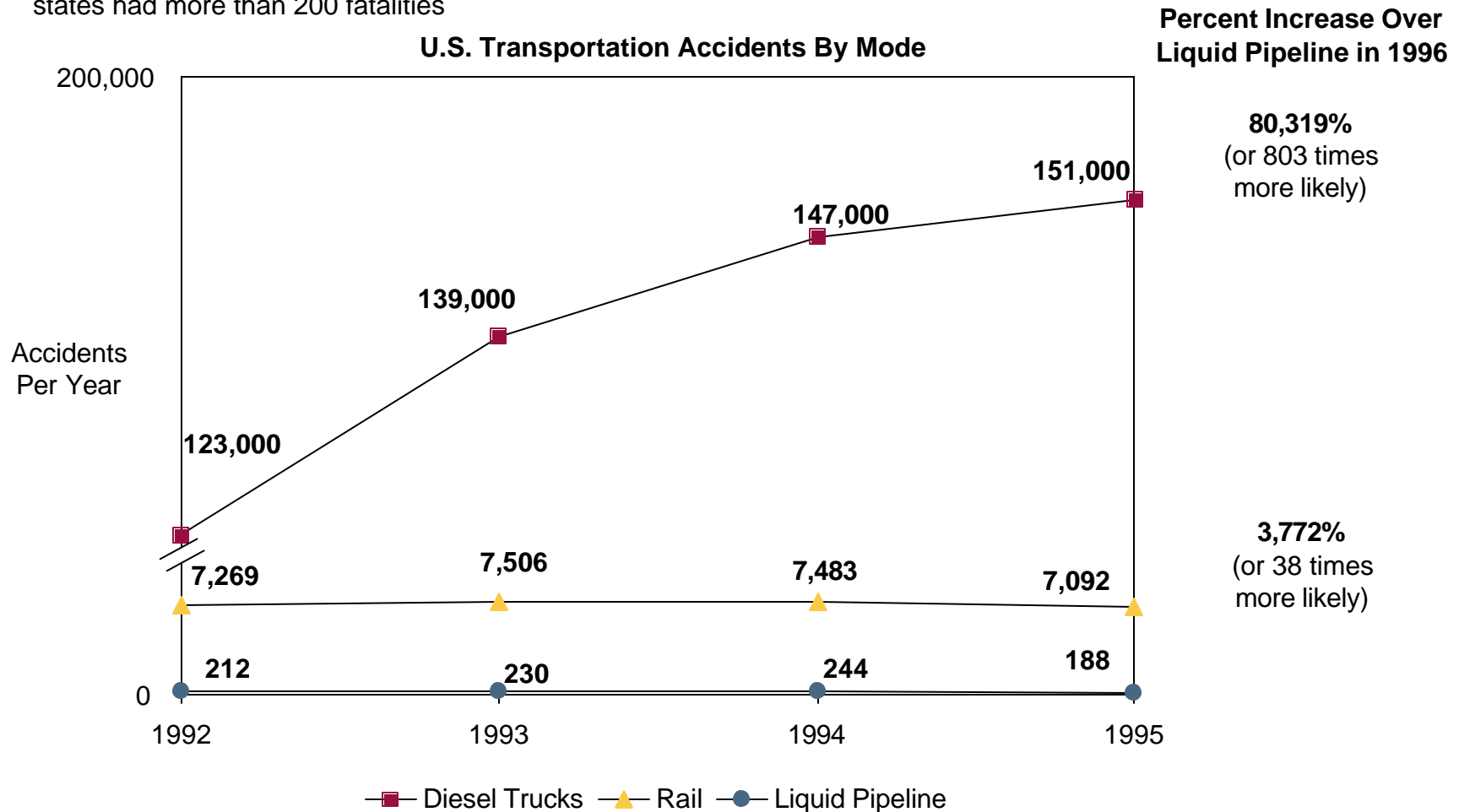
Pollution and Safety Impacts

Between 2003 and 2005:

- 4.0 - 4.5 tons of particulate matter per year will be emitted (equivalent to the particulate matter produced by 8,500 - 9,500 average passenger cars)
- 68.5 - 72.0 tons per year of NOx will be emitted (equivalent to the NOx produced by 7,700 - 8,400 average passenger cars)
- The new diesel truck traffic will likely be concentrated in areas near refineries, terminals and transloaders; therefore a community specific analysis should be conducted to estimate the added pollution and health impacts

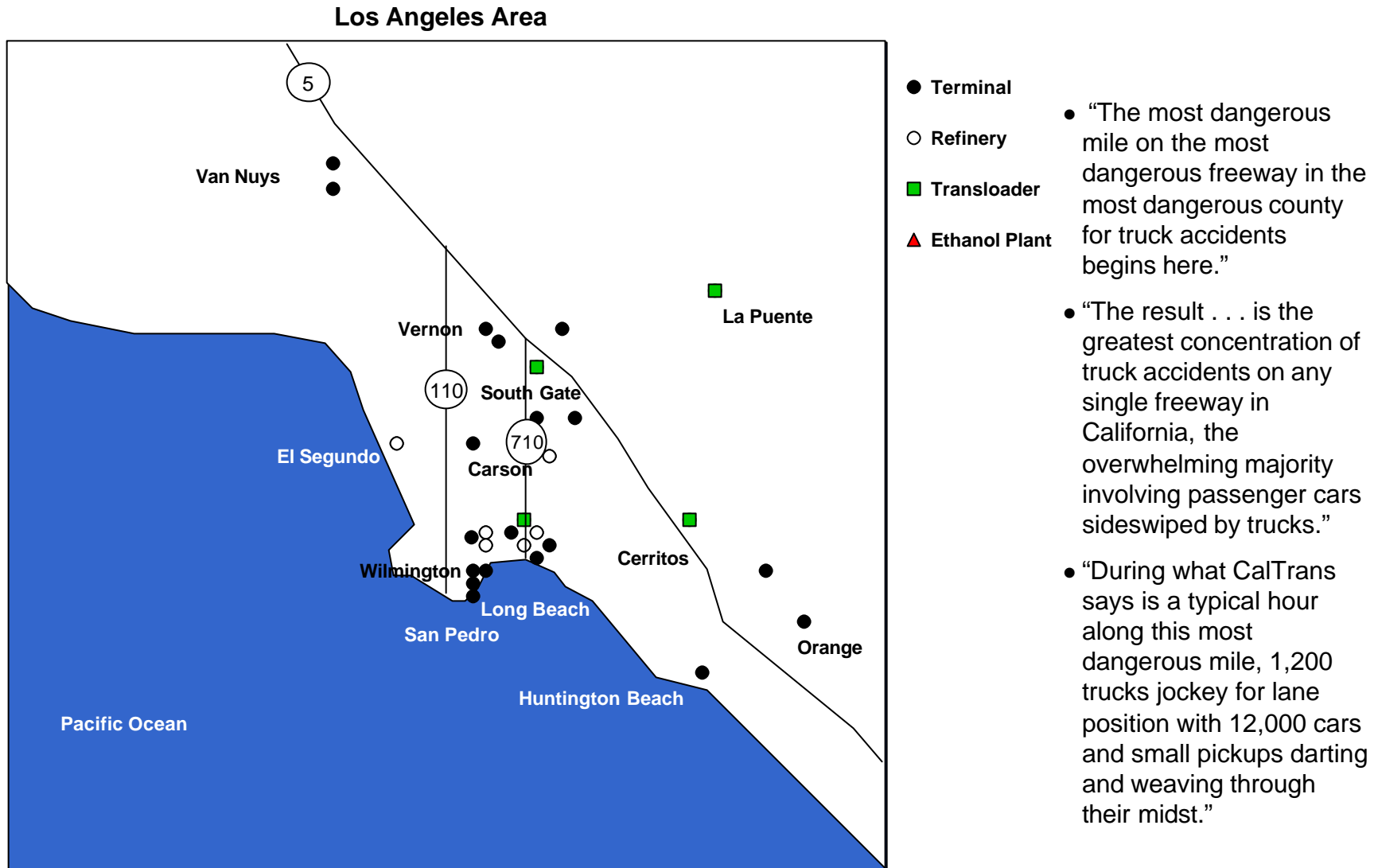
Switching From a Pipeline Transportation System to a Rail and Truck Dependent System Dramatically Increases the Risk of Accidents

- California has the highest annual fatality rate for trucks of any state; 379 fatalities occurred in 1995 — only three other states had more than 200 fatalities



Source: Department of Transportation; Bureau of Transportation Statistics; National Highway Traffic Safety Administration; Truck and Bus Crash Factbook, 1995. Prepared by The Center for National Truck Statistics at The University of Michigan Transportation Research Institute

Many Facilities in Los Angeles Area Along the “Most Dangerous Mile” Intersection of the 5 and 710 Freeways As Described by the LA Times



Source: OPIS Petroleum Terminal Encyclopedia (1999 edition), Monitor Analysis; Ray Herndon, Los Angeles Times August 15th.

Below is a List of Zip Codes By Major Area of California In Which There Is a Terminal, Refinery, or Transloader

Los Angeles Area	SF Bay Area	Sacramento Area	San Diego Area	Bakersfield Area	Other Areas
Los Angeles 90058, 90061	Brisbane 94005	West Sacramento 95691	National City 91950	Bakersfield 93308, 93307	Fowler 93625
South Gate 90280	South SF 94080	Sacramento 95818	San Diego 92108, 92113		Fresno 93725
Montebello 90640	Martinez 94553	Rancho Cordova 95742			Eureka 95503
Santa Fe Springs 90670	Oakland 94603				Chico 95928
Carson 90810	Richmond 94801, 94804, 94807				Imperial 92251
Rancho Cucamongo 91730	San Jose 95131, 95133				Mojave 93502
Bloomington 92316	Stockton 95203, 95206				
Colton 92324	Tracy 95376				
Huntington Beach 92647	Crockett 94525				
Anaheim 92807	Warm Springs 94539				
Orange 92867	Rodeo 94572				
Ventura 93001					
Wilmington 90744					
Long Beach 90805, 90813					
Signal Hill 90806					
Van Nuys 91411					
El Segundo 90245					
Torrance 90504					
Paramount 90723					
City of Industry 91746					

Source: Monitor Analysis

Conclusion

Next Steps....

Resolve the Unstudied Risks

- **Will there be enough ethanol to meet California demand?**
- **What price will Californians pay for ethanol that is available?**
- **What groups / communities will most adversely be affected by the risks associated with increases in price, traffic and pollution?**