# The Future of Fuels
# California as a Benchmark

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# The Nation-State of California

- The state has a long history of fighting air pollution
  - California Air Resource Board (CARB)
  - South Coast Air Quality Management District (SCAQMD)
- Early to ban or control
  - Lead
  - Olefins
  - RVP
- New fuel formulations
  - CARB Diesel
  - CARB Gasoline – Phase I, II, III

**Sacramento leads the world in controlling air pollution**

# The Nation-State of California

- **Refining industry**
  - Thirteen gasoline producing refineries, half dozen asphalt
  - Crude Runs 1750 TBD
  - Production
    - Designed to handle local sour and heavy crudes
    - Highest complexity refineries in the world
    - Running at capacity – State is net importer across the barrel
    - Capacity creep < 1% per year
    - Difficult operating and permitting environment
- **Regional supply**
  - California, Nevada, most of Arizona, Oregon & Baja California
- **Gasoline demand growing 2-3% per year**

**Largest gasoline market in the world after US as a whole**

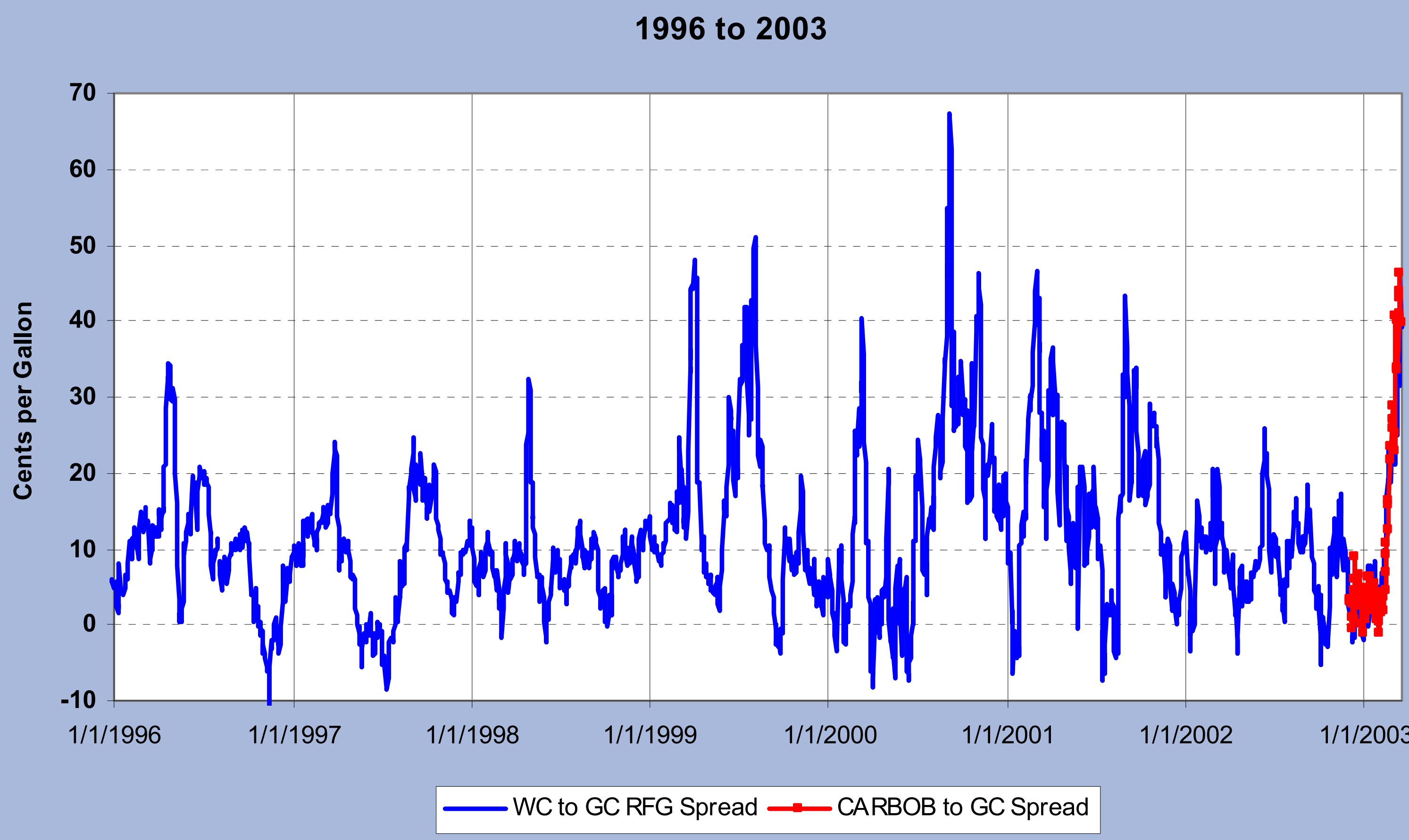
# CA Gasoline and Component Movements


**S-CA is most dependent on imports, N-CA is net exporter**

# California Energy Commission Studies

- Refining industry in California experienced significant outages in 1999
- The ensuing price volatility lead to an Attorney General investigation and legislation
- The legislation called on the California Energy Commission to study the following:
  - Reduce Dependence on Petroleum
  - Pipeline from the Gulf Coast
  - Strategic Fuel Reserve
- SFR study was the genesis of the 2001 MTBE study

# West Coast/Gulf Coast RFG Spreads



# MTBE

- **Mandated MTBE phase-out in 1999**
  - Due to groundwater contamination
- **Decided to delay the phase-out by a year in 2002**
  - Phase-out would result in supply problems
  - Increase the risk of price spikes
- **A year later…**
  - Ethanol prices are much lower
  - Most refiners have decided to blend with ethanol
  - Transition to summer blending began two weeks ago

**Proof of the pudding yet to come**

# Gasoline Supply/Demand Balance

- About 80% of California's gasoline will be clear or blended with ethanol this spring
- CEC estimates a 1.5% decrease in gasoline production
  - Loss of MTBE and pentane -15%
  - Ethanol, increased refining and imports +13.5%
- Demand estimated to increase by 2.0% vs. 2002
- Required additional CARBOB or component imports 35 TBD
  - Sourcing will be a challenge
  - Import facilities almost exclusively in the hands of local refiners
  - Any refinery disruption will have serious consequences

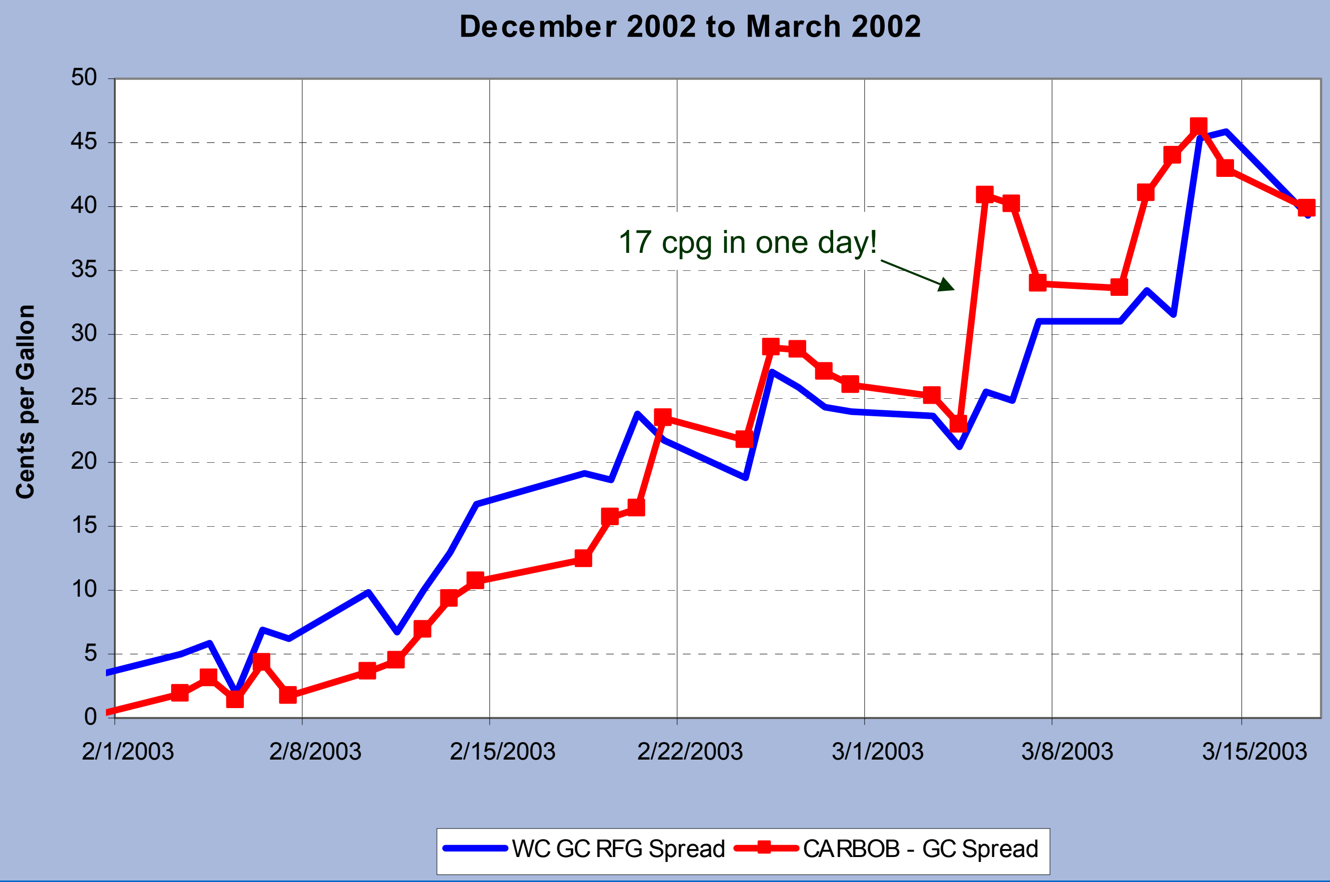
**Fortune cookie: May you live in interesting times**

# The Latest Price Spike

- Transition to summer RVP E CARB
  - Only 76 really knew how tough summer CARBOB could be
- Refining problems
  - BP Carson's FCC/Alky Turnaround completion late
  - Valero Wilmington & M CARB
  - Issues in the Bay
- Supply problems
  - Tanker delays: It's a long way from Finland
  - Difficulties meeting pipeline schedules: Short squeezes on the pipe

**Who is telling the story?**

# West Coast/Gulf Coast RFG Spreads



# CEC - Reduce Dependence on Petroleum

- Goal – reduce the rate of growth in demand
- Recommendations
  - Increase transportation efficiency
  - Increase non-petroleum fuel use
  - Examine pricing tools
  - Look at other options
- Final draft due mid March 2003
  - Late April workshop likely

**Consumer behavior, urban sprawl to blame**

# CEC - Gulf Coast Pipeline

- Study the feasibility of a new pipeline, or utilizing existing pipelines, to transport motor vehicle fuel or its components from the Gulf Coast to California
- Included analysis of the US Flag tanker market, USGC supply
- Conclusions:
  - A new pipeline would not be economic
  - State of California should support completion of Longhorn Pipeline
  - State may support expansion of Kinder Morgan East Line from El Paso to Tucson & Phoenix
  - US Flag fleet insufficient to supply California from the USGC

**Incremental supply will have to be imported from abroad**

# CEC - Strategic Fuel Reserve

- Looked at causes of volatility – barriers to supply
  - Refining capacity
  - Distance
  - Specifications
  - Logistics
  - Unocal patents
  - Lack of forward market
- Proposed novel approach to a fuel reserve
  - Gasoline Bank of California
  - Spun off additional studies by CEC
  - Currently being analyzed

**Primarily designed to facilitate imports**

# Smog Reduction

- South Coast Air Quality Management District Rule 1178
  - Agreed with environmental groups to reduce oil industry VOC's by 3 tons per day
  - Rule 1178 requires that refiners and terminal operators put geodesic domes on all floating roof gasoline and gasoline component tanks
  - Objective is to reduce the evaporation of hydrocarbons from the interior walls of tanks
  - Industry estimated that the cost in the LA Basin would be $130 MM for 0.9 daily tons of VOC
- Recommendation:
  - Alternative solutions need to be found
  - Trade mobile for stationary emissions?

# What's Next?

- The Predictive Model for gasoline could be reopened
  - Due to be updated for new car population and emissions data
  - Difficult now to blend 7.8% ethanol, most blending at 5.6%
  - Could allow 10% ethanol blending if NOx acceptable
- Ethanol – cellulose vs. starch
  - Continuing work to create ethanol from trash
  - Some corn or sugar cane ethanol could happen
- Ongoing struggle to reduce air pollution
  - Cost effective solutions are lacking

# Stationary vs. Mobile Emissions

- In concentrated markets, such as SF Bay and LA Basin, the majority of refinery products are consumed in the same air basin in which they are produced
- Tailpipe emissions are orders of magnitude greater than refinery emissions
- Currently, refiners have no incentives to blend to better than minimum conformance within Models
- Tighter blending and additizing can offer cheaper alternative for emission reduction
- Timing may be right if PM gets reevaluated anyway

**Requires joint approach by industry, legislators**

# Latest Developments



- Global warming?
- Diesel issues?
- The next round of SCAQMD regulations?
- The Hydrogen Economy?

**It pays to keep an eye on California**