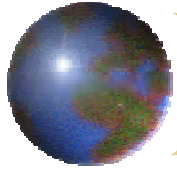


# *The Outlook for Oil & Gas: Divergence or Chaos?*

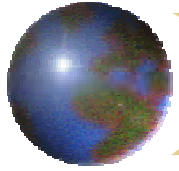
JULY 2002

MICHAEL C. LYNCH



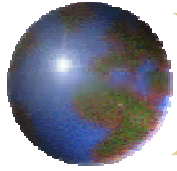
# *BUBBLE CHARACTERISTICS*

- ✿ CERTAINTY THAT IT'S NOT
- ✿ ABNORMAL INFLATION
- ✿ SOME RESULTS DUE TO FEEDBACK
  - ▣ SALES OR DOT.COM PROFITS?
  - ▣ INTANGIBLE ASSETS
  - ▣ BORROWING FOR MORE STOCK
    - ENRON AND WORLDCOM
      - STUPIDITY AND SELF-DEFEATING



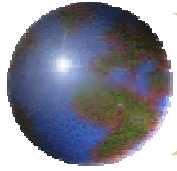
## *“THE PERFECT STORM”*

- ❖ RAPID GROWTH RAISES PRESSURE ON ALL COMPANIES
- ❖ STOCK OPTIONS INCREASE PRESSURE TO MEET TARGETS
- ❖ NEW METHODS OF BUSINESS REDUCE TRANSPARENCY
- ❖ BOOM TIMES BRING IN MANY INEXPERIENCED EMPLOYEES



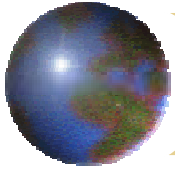
## *SOURCES OF DISCOMBOBULATION*

- ⊕ APRIL 2000: JOINED WEFA, MOVED OFFICE
- ⊕ FEBRUARY 2001: BOUGHT HOUSE
- ⊕ MAY 2001: DRI & WEFA MERGED
- ⊕ OCTOBER 2001: MOVED TO DRI OFFICE
- ⊕ APRIL 2002: LOST APARTMENT IN BOSTON, MOVED INTO HOUSE
  - ⊕ COMMUTE BECOMES 3.5 HOURS/DAY DRIVING
- ⊕ JUNE 2002: LEFT DRI-WEFA, MOVED OFFICE
- ⊕ FORGIVE THE DISORGANIZATION (GOMEN)

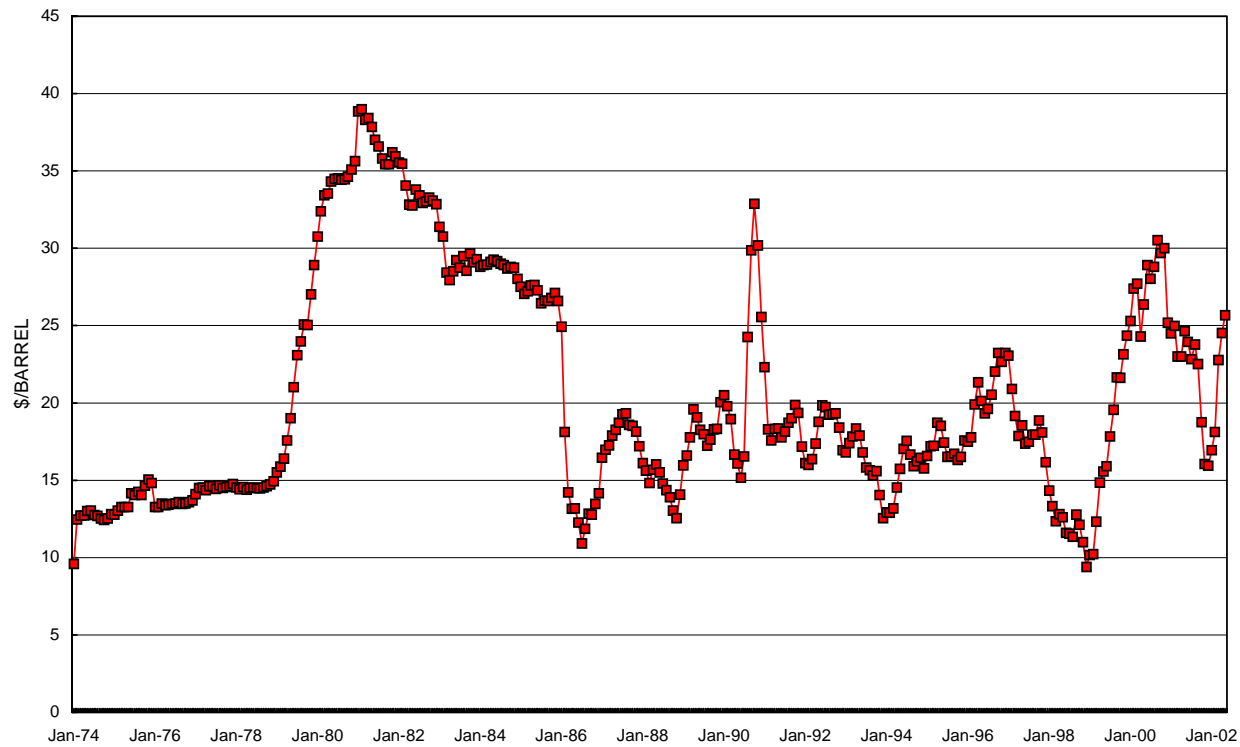


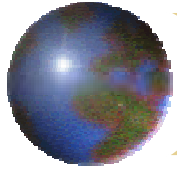
## *“DÉJÀ VU ALL OVER AGAIN”*

- OIL, GAS PRICES SOARING
  - OPEC POWERFUL, AGGRESSIVE
- BLACKOUTS, BROWNOUTS
- GOVERNMENT ROLE IN TRANSITION, UNCERTAIN
  - CALIFORNIA
  - VENEZUELA



## *US PRICE FOR IMPORTED OIL*



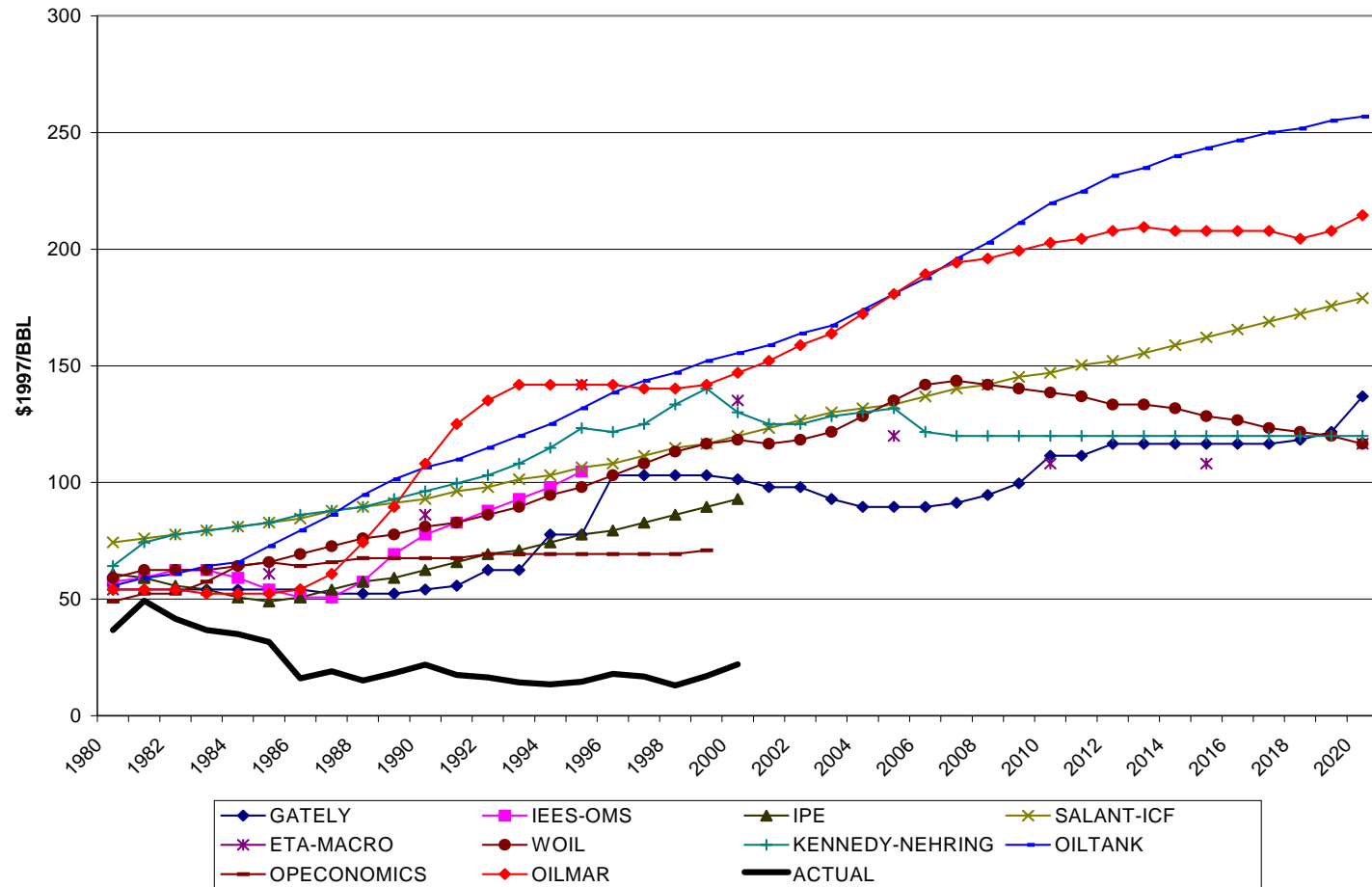


## *LESSONS OF THE PAST*

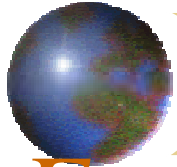
- ❖ CONSENSUS VERY BAD
- ❖ FORECASTS SUFFERED FROM MALTHUSIAN BIAS, RECURRING ERRORS
- ❖ FORECASTERS SLOW TO CORRECT
- ❖ SIMPLISTIC RULES SUBSTITUTED FOR IN-DEPTH ANALYSIS

# EMF6 Oil Price Forecasts (1980)

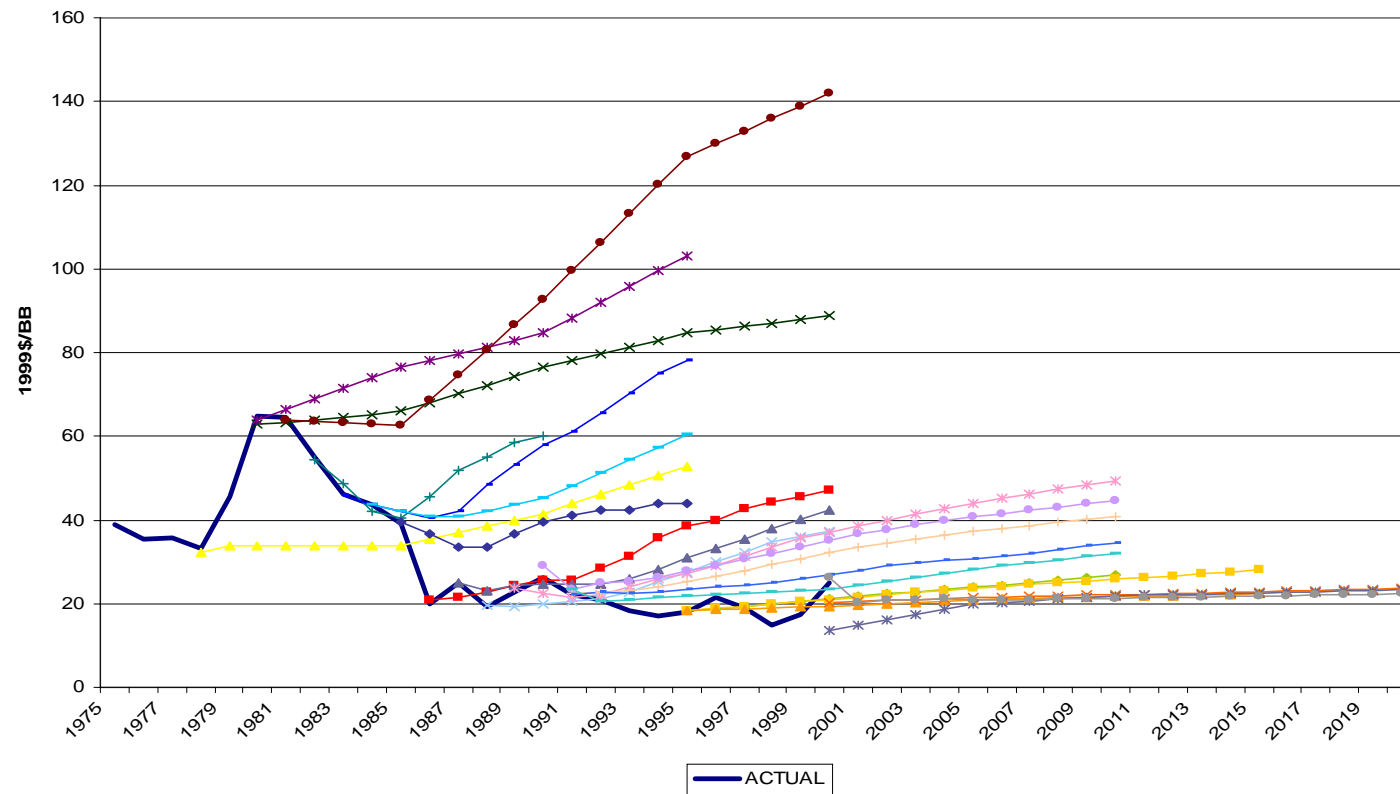
## Computers Never Lie

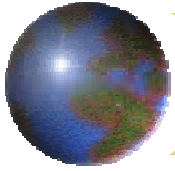




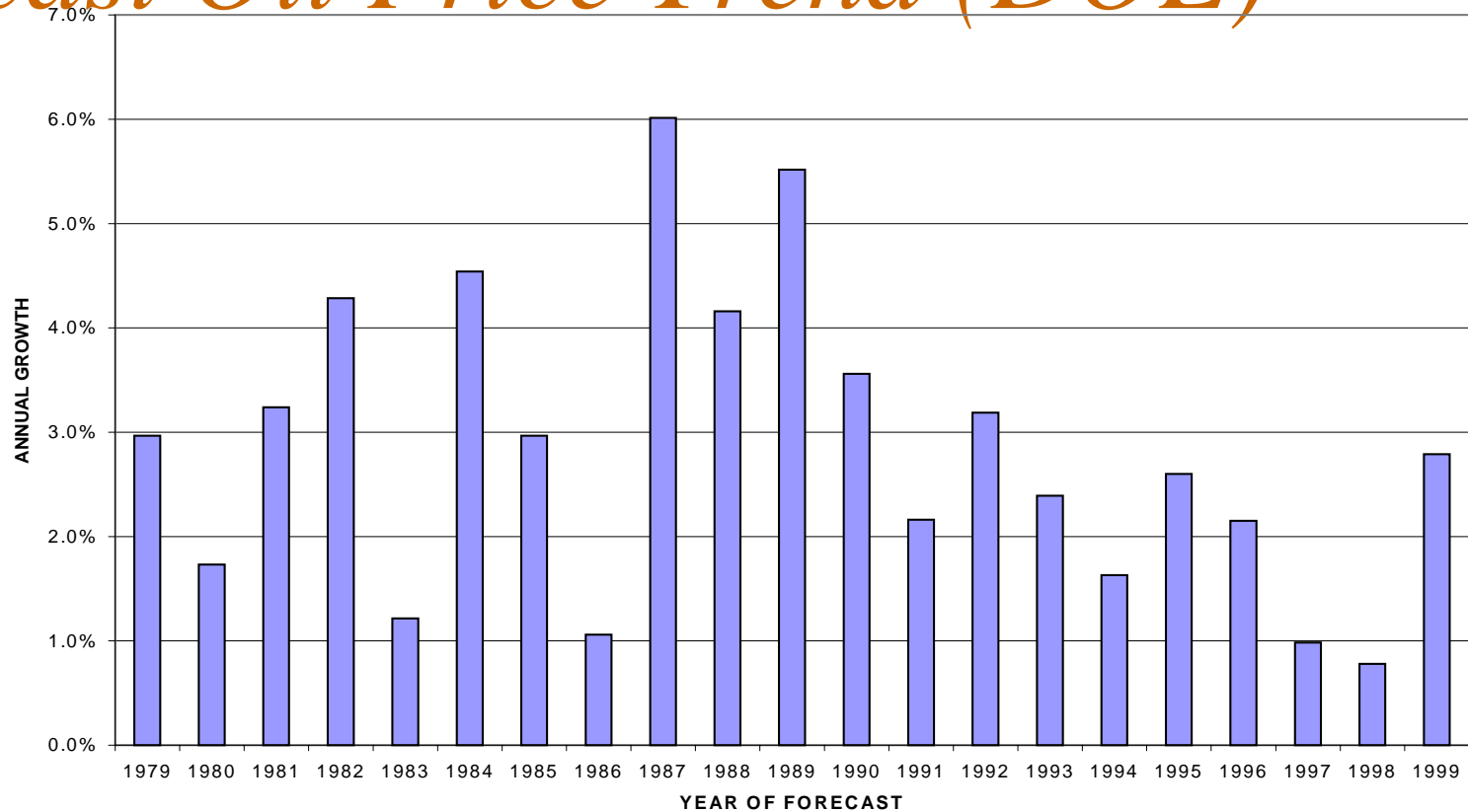


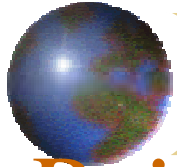
# *Evolution of DOE Oil Price Forecasts*



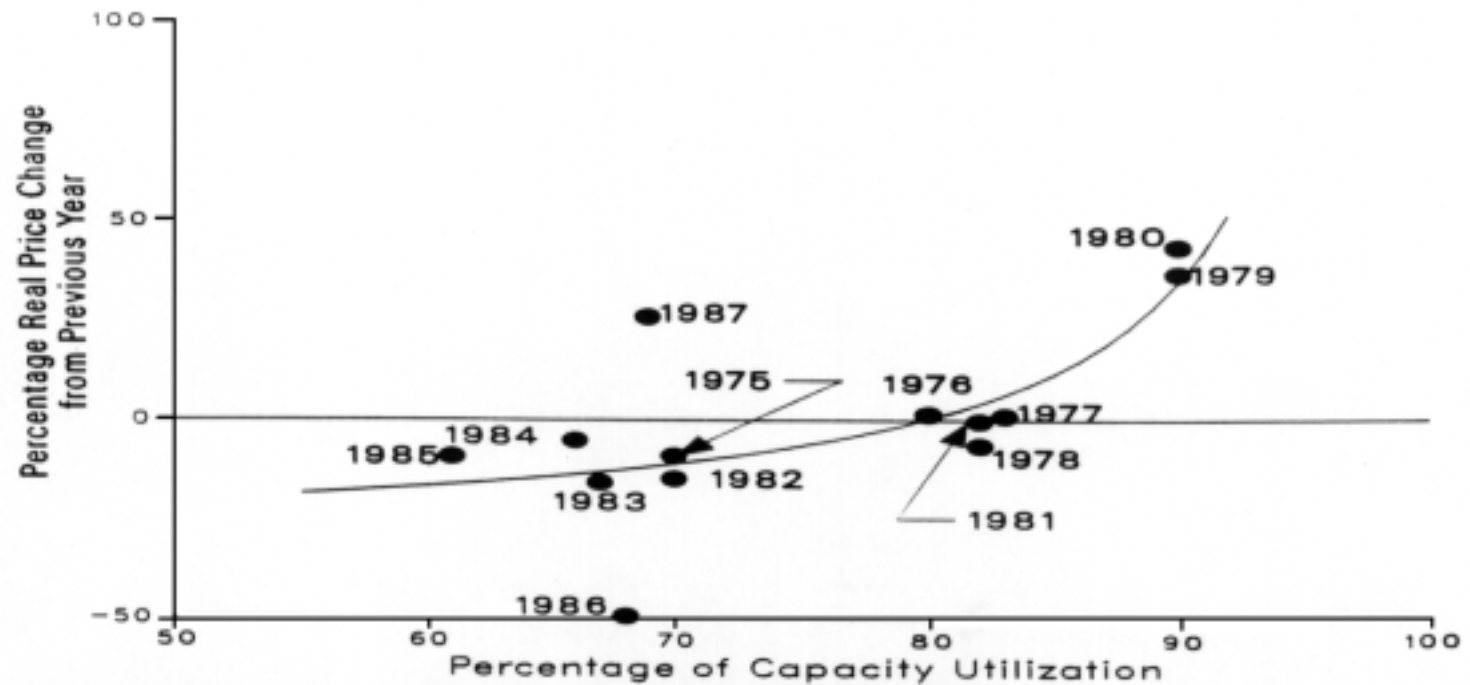


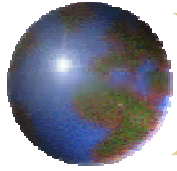
## *Forecast Oil Price Trend (DOE)*





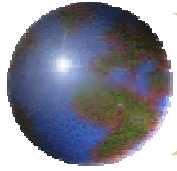
# *Price Algorithm (von Maelzel's Ghost)*



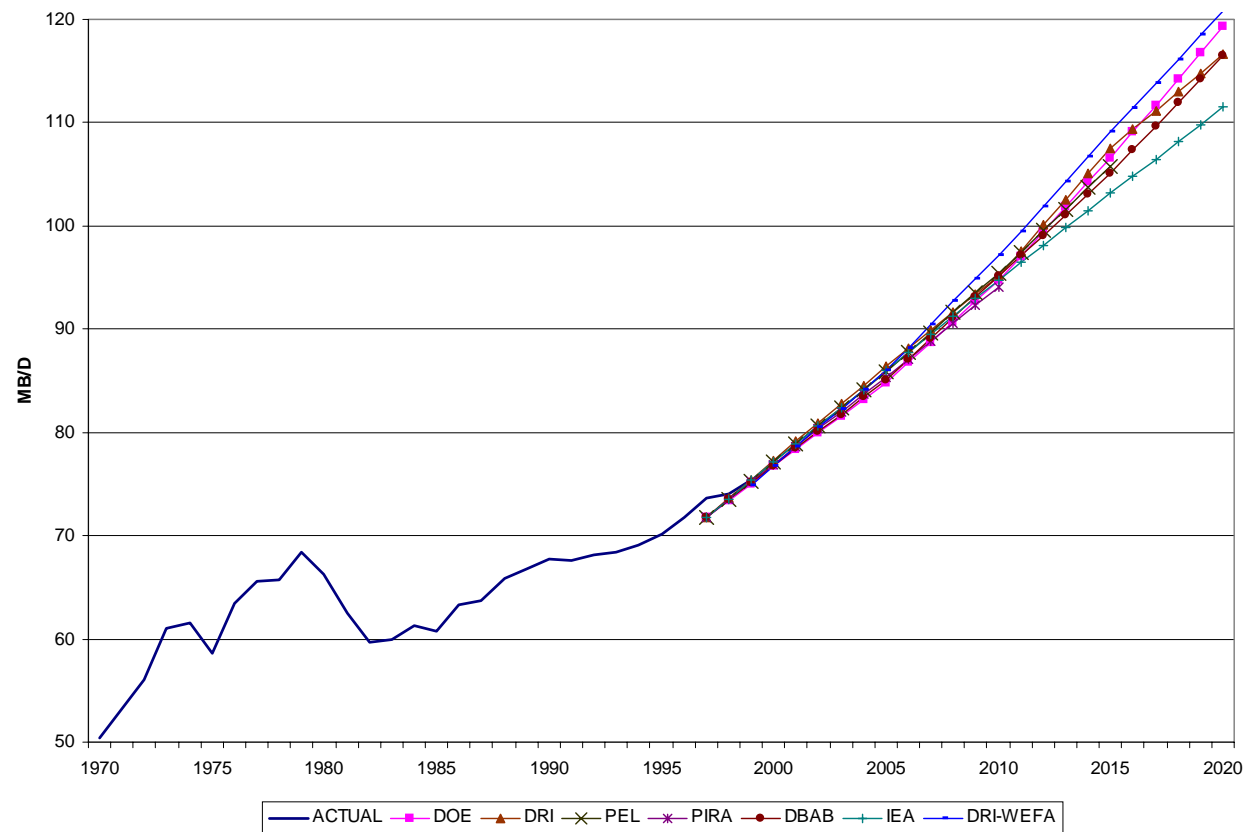


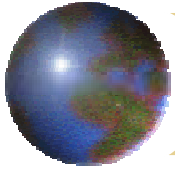
## *Consumption Is Easy*

- ✚ High degree of consensus
- ✚ Economics is primary element
  - ▣ Growth in one yields growth in the other
  - ▣ S-Curve
  - ▣ Beware Chinese gowns
- ✚ Price should not be ignored
  - ▣ Crude prices often secondary to taxes
  - ▣ Still some price effect on demand
- ✚ But substantial policy uncertainties
  - ▣ Carbon taxes
  - ▣ Nuclear power trends

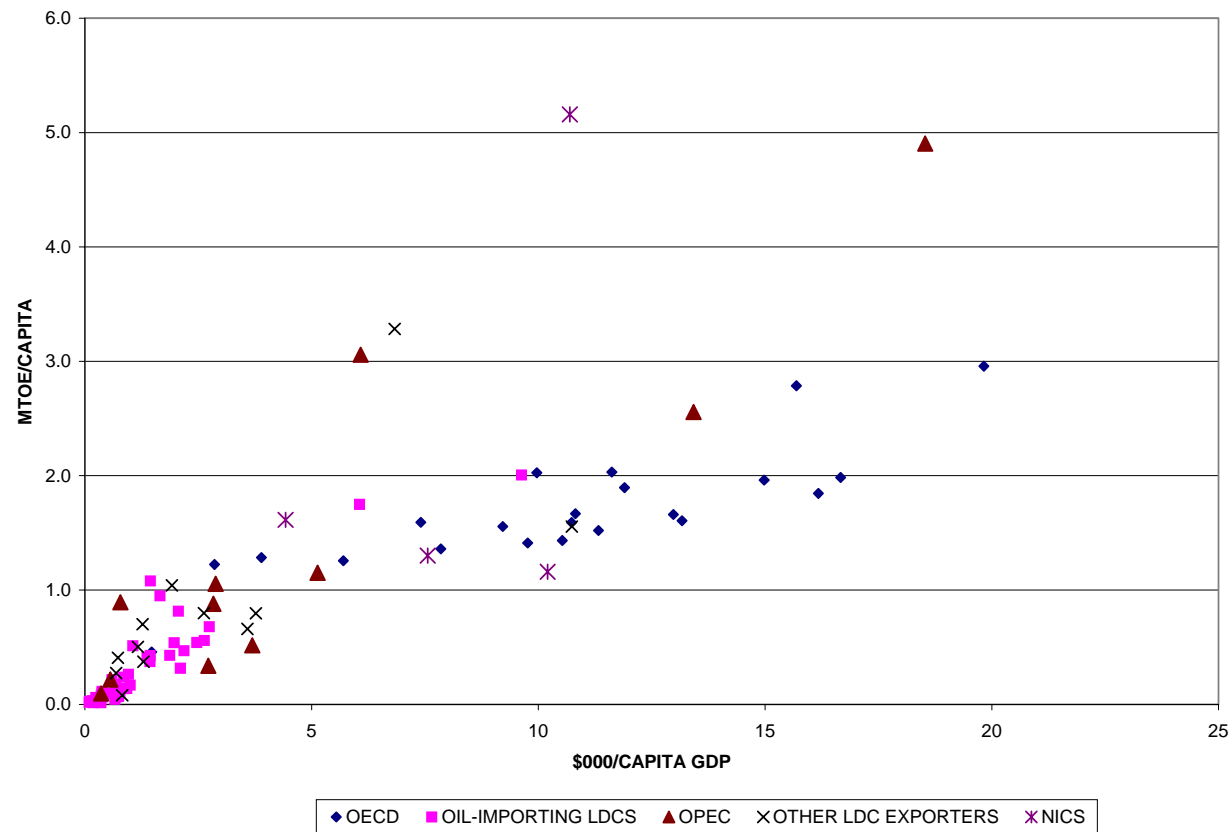


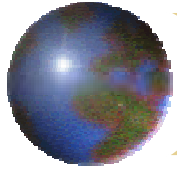
# *OIL CONSUMPTION FORECASTS*



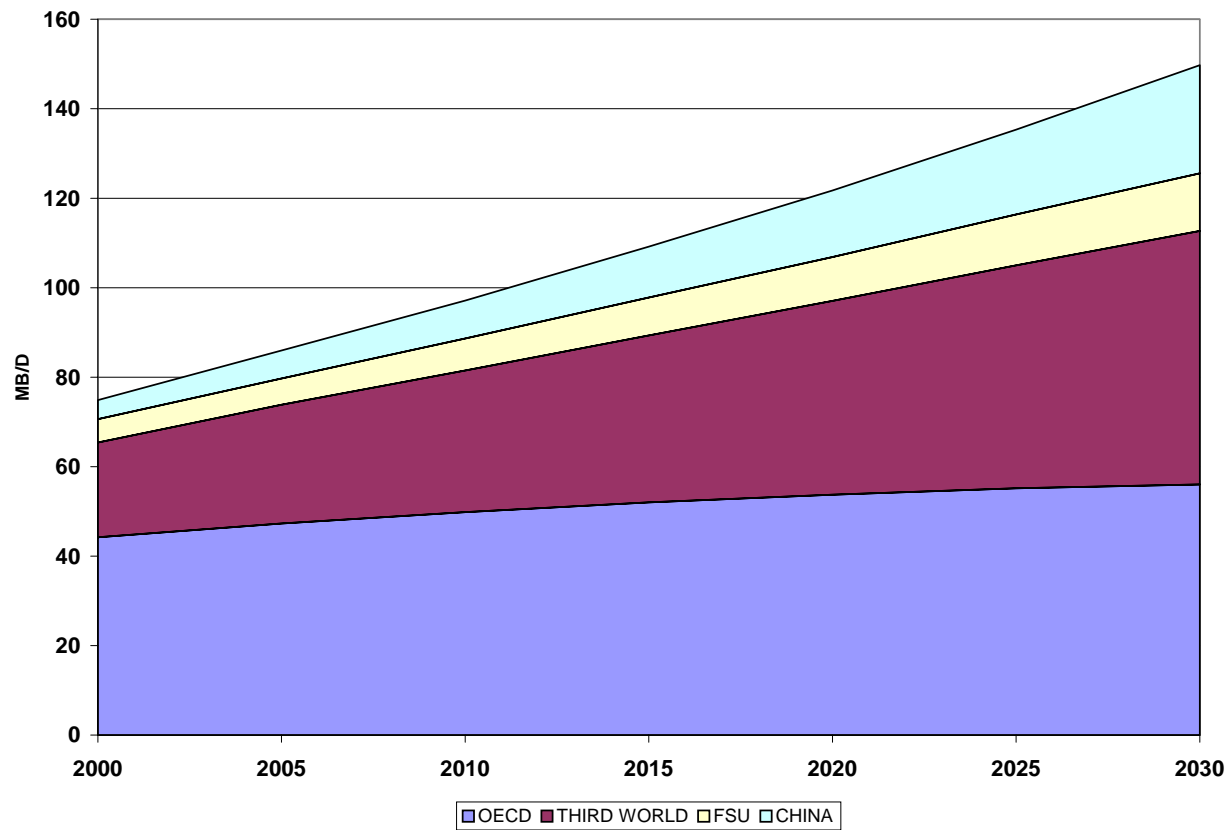


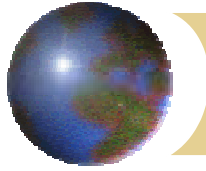
$$DEMAND = F(GDP)$$





# *WORLD OIL CONSUMPTION*

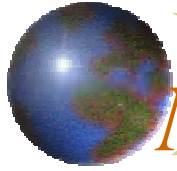




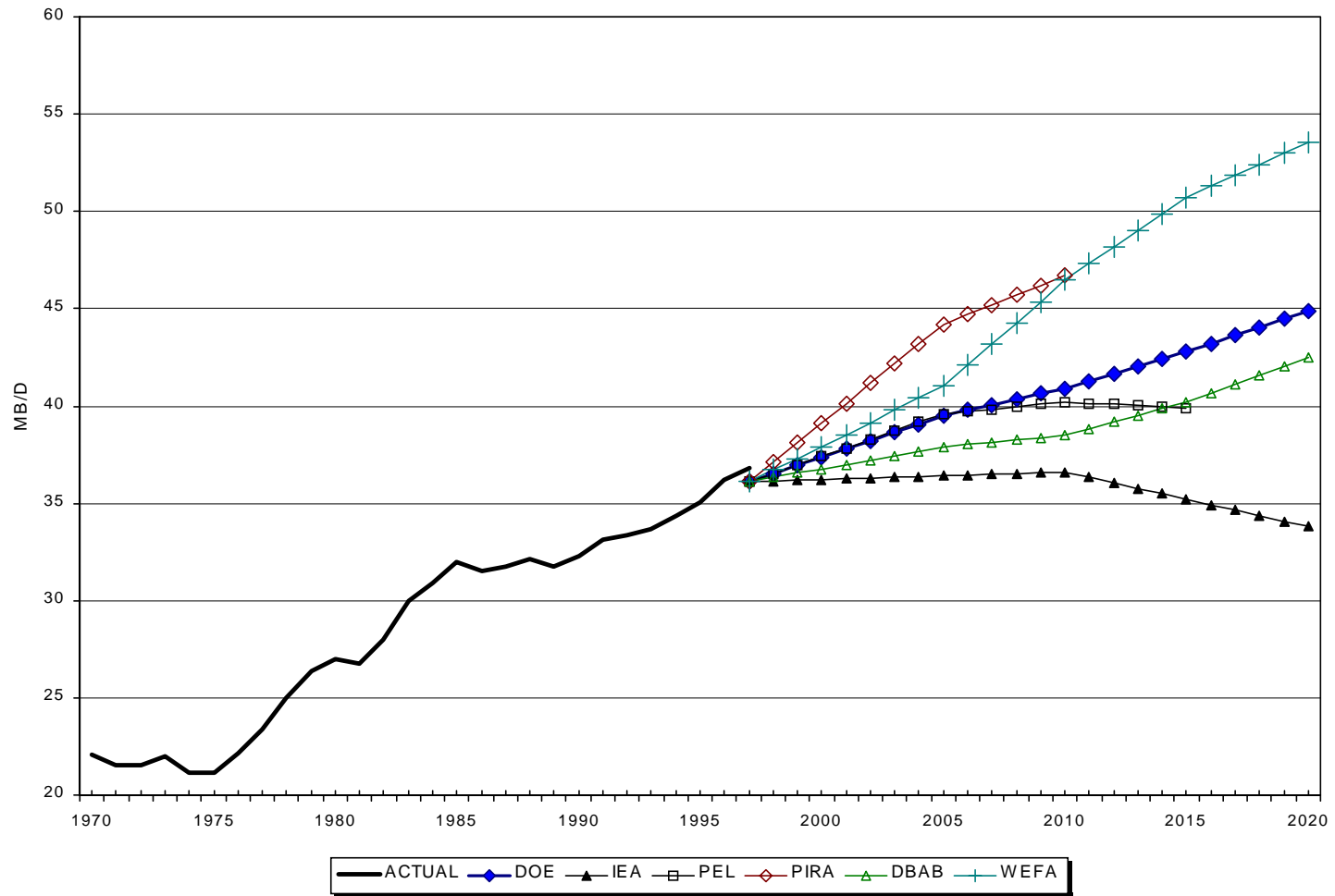
# *Supply Forecasting More Difficult, Contentious*

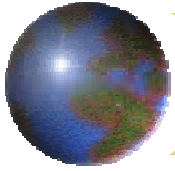
- ⊕ Much Less Consensus
- ⊕ Widely Diverging Theories
  - ⊞ Hubbert, RTD, Empirical, Top-down
- ⊕ More Challenging Modeling
  - ⊞ Poor Data
  - ⊞ Dummy Variables Dominant
    - Price Controls, Fiscal Regimes
    - Acreage Access
- ⊕ Implications For Price Forecasting
- ⊕ See Lynch, 2002 (Quarterly Review of Economics and Finance)





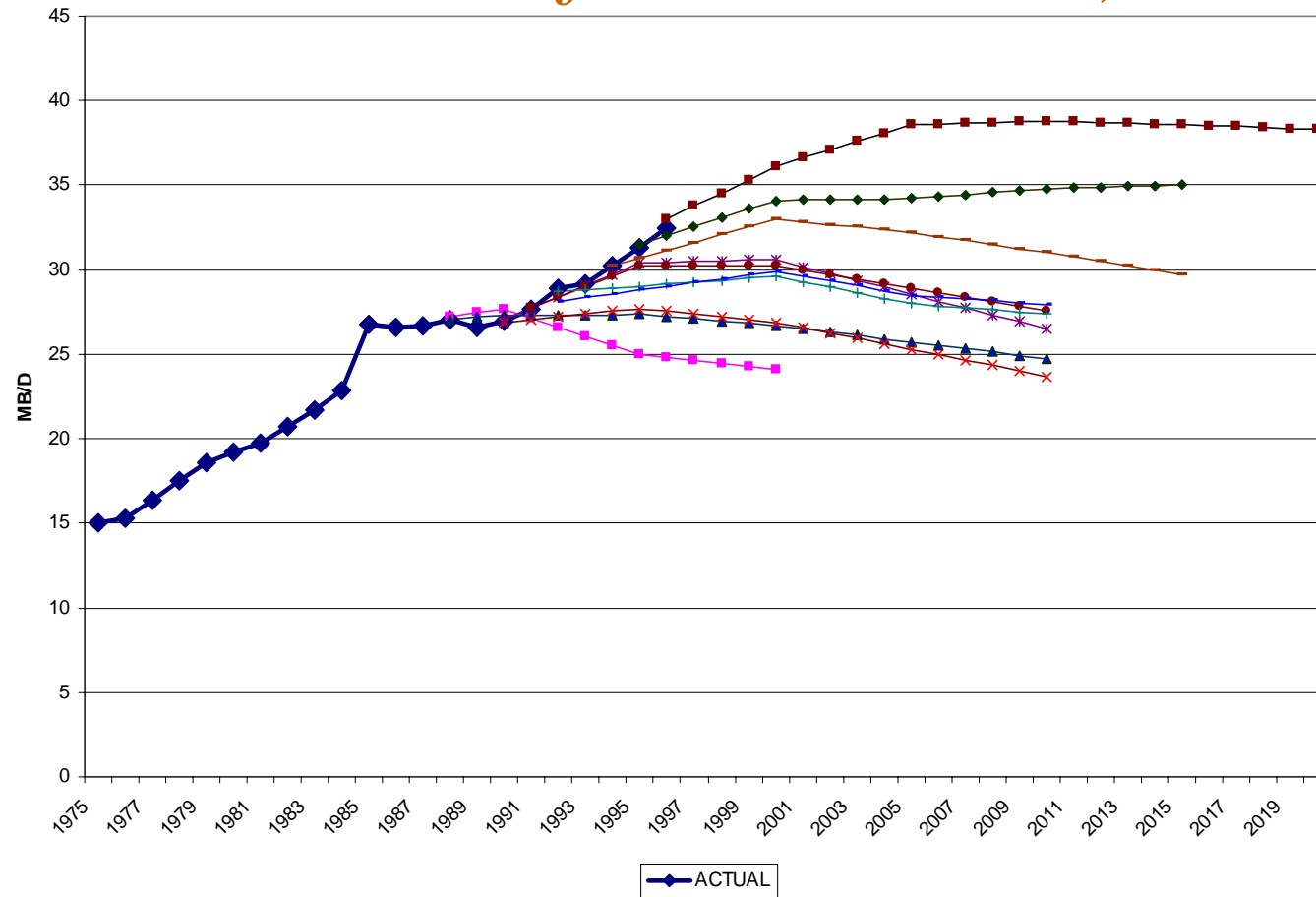
# *Non-OPEC Oil Production (Excluding FSU)*

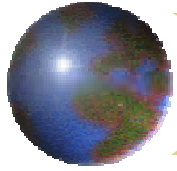




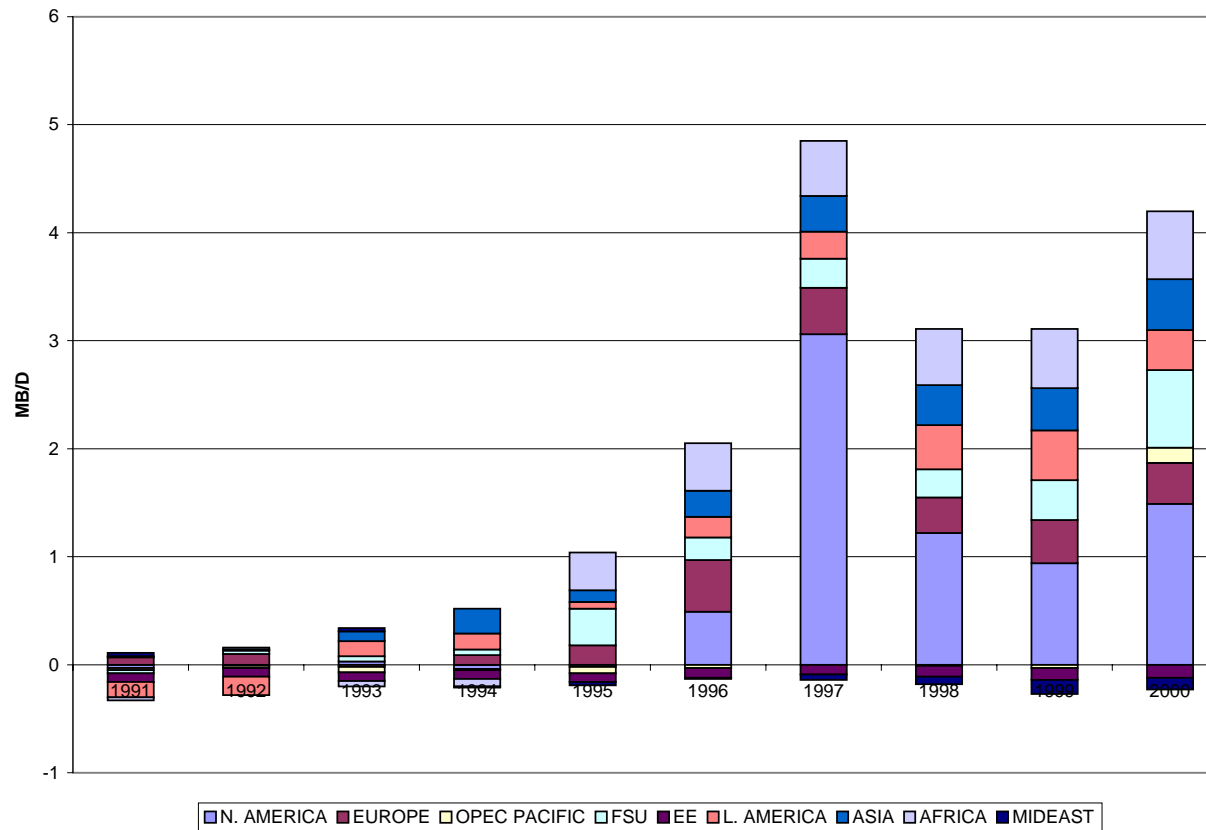
# *Non-OPEC Production*

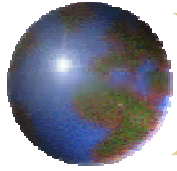
## *(DOE Forecasts from 1989 On)*





# *ERROR IN NON-OPEC SUPPLY PROJECTIONS (IEA 1995)*





# *Supply Forecasting*

## ⊕ How and why in Error

### ⊞ Always conservative

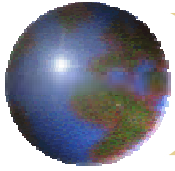
- Everybody peaks soon
- Opposite curve of price forecasts

### ⊞ Always pessimistic

- 95% of forecasts too low

### ⊞ Accuracy drops quickly

- Often only 1-2 years, not 8-10



# *SUPPLY FORECAST*

