MEMORANDUM

DATE: December 30, 1997

FROM: John H. Lichtblau

RE: IEA Presentation - November 12, 1997

Attached is a copy of the viewgraphs presented at an IEA session in Paris on historic oil trends and developments.
FIFTY YEARS DEALING WITH CYCLES OF OPTIMISM AND PESSIMISM

John Lichtblau
Chairman, Petroleum Industry Foundation Inc.

Joint Session

STANDING GROUP ON THE OIL MARKET
STANDING GROUP ON EMERGENCY QUESTIONS
12 NOVEMBER 1997
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Before... And... After 1973

Price Low, Stable
Majors in Control
Volume Soaring

Price Higher, Volatile
Producing Gov'ts Take Control
Volume Falling, Flat, then Rising

Markets Dominate
The 1973 Break: Crude Oil Prices

WTI NOMINAL $  WTI (1997$)

AVERAGE 1950-73  
S3.03/BBL  15.23/BBL

AVERAGE 1973-97  
S18.78/BBL  S28.22/BBL
WORLD PRODUCTION QUADRUPLED WHILE REAL PRICES DECLINED BY NEARLY 50%. MIDDLE EAST LARGEST GROWTH AND LOWEST COST REGION.
AVERAGE ANNUAL GROWTH RATE 7% (8% IN 1968/73 PERIOD). NEARLY ALL EUROPEAN CONSUMPTION IMPORTED.
DEMAND GROWTH REQUIRED LOW PRICES. RESIDUAL FUEL OIL, PRICE COMPETITIVE WITH COAL, LARGEST REFINED PRODUCT IN EUROPE IN EARLY 70'S
MIDDLE EAST LOWEST COST, FASTEST GROWTH. SEVEN SISTERS SET VOLUME AND PRICE.
1960, AFTER OIL COMPANIES LOWERED PRICES

IRAN, IRAQ, KUWAIT, SAUDI ARABIA, & VENEZUELA

GOAL: PRICE DETERMINATION; PRICE STABILITY; RESOURCE SOVEREIGNTY
# October 1973: The New World Dawns

<table>
<thead>
<tr>
<th>SETTING THE STAGE</th>
<th>OCTOBER 1973</th>
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<tbody>
<tr>
<td>• Participation &amp; Taxes</td>
<td>• Arab-Israeli War</td>
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<tr>
<td>• Negotiated Prices</td>
<td>• Embargo/Cutback</td>
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<tr>
<td>• No Spare Capacity</td>
<td>• OPEC Sets Prices</td>
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<tr>
<td>• &quot;Inexorable&quot; Growth</td>
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<tr>
<td>• First Nationalization's</td>
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**FIRST PRICE EXPLOSION - IRREVERSIBLE INCREASE**
Production Since 1973: Decline and Revival

MIDDLE EAST SHARE BELOW 20% IN 1985. SHIFT IN WORLD RESERVES OWNERSHIP: 1997 80% GOVERNMENT OWNED; 1973 LESS THAN 25% GOVERNMENT OWNED.
Consumption Since 1973: Decline and Revival

Average Annual Growth Rate 1973-1996

World 0.85%

World Excl. FSU 1.20%
SHIFT FROM INDUSTRIAL COUNTRIES TO DEVELOPING COUNTRIES. "OTHER" PRIMARILY ASIAN EMERGING MARKET ECONOMIES.
MIDDLE EAST DOMINATES
OPEC REGAINING AFTER 1986 PRICE BREAK.
### Oil's Share of World Primary Energy Consumption

<table>
<thead>
<tr>
<th></th>
<th>Global</th>
<th>Excl. FSU</th>
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<tbody>
<tr>
<td>1965</td>
<td>37.1</td>
<td></td>
</tr>
<tr>
<td>1975</td>
<td>43.9</td>
<td>45.5</td>
</tr>
<tr>
<td>1985</td>
<td>37.9</td>
<td>39.5</td>
</tr>
<tr>
<td>1990</td>
<td>38.6</td>
<td>40.3</td>
</tr>
<tr>
<td>1996</td>
<td>39.5</td>
<td>41.8</td>
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</table>

**RISING PRICES (1973-1985) CAUSE DROP IN OIL’S SHARE. PRICE BREAK IN 1986 REVERSES TREND. OIL’S SHARE IN RUSSIAN(FSU) ENERGY DROPS FROM 30% IN 1990 TO 21% IN 1996.**
“CLUB OF ROME” 1972 FORECAST TO 21ST CENTURY: 3 GROWTH RATE SCENARIOS FOR OIL, 2.9%, 3.9%, 4.9%.

ACTUAL GROWTH RATE 1973-1996 LESS THAN HALF OF “CLUB OF ROME” LOW SCENARIO FORECAST.
"CLUB OF ROME" PREDICTED RESOURCE CONSTRAINT BY END OF CENTURY.

WORLD RESERVES:
1973: 600 BILLION BARRELS,
1996: 1 TRILLION BARRELS.

CUMULATIVE WORLD PRODUCTION 1973-1996:
500 BILLION BARRELS
### Looking at 1980 from 1970-71

<table>
<thead>
<tr>
<th>Forecast of</th>
<th>By</th>
<th>1970 Actual</th>
<th>1980 Forecast</th>
<th>1980 Actual</th>
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<tbody>
<tr>
<td>U.S. Supply</td>
<td>Oil Import Task Force</td>
<td>9.6</td>
<td>11.1-12.7</td>
<td>8.6</td>
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<tr>
<td>Price</td>
<td>Oil Import Task Force</td>
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<td>Constant Real</td>
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<tr>
<td>U.S. Demand</td>
<td>Nat'l Petroleum Council</td>
<td>14.7</td>
<td>22.3</td>
<td>17.1</td>
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<tr>
<td>“NCW” Demand</td>
<td>Nat'l Petroleum Council</td>
<td>40.1</td>
<td>72.1</td>
<td>49.6</td>
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<tr>
<td>Price</td>
<td>Nat'l Petroleum Council</td>
<td></td>
<td>“Moderately higher”</td>
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**REAL PRICE TRIPLLED 1970-1980.**

**ACTUAL OIL VOLUMES IN 1980 APPROXIMATELY ONE THIRD BELOW FORECASTS.**
VOLUME PROJECTION CLOSE TO ACTUAL (SO FAR).

PRICE PROJECTIONS IN WRONG DIRECTION.
A 1980 Projection for 2000: Right and Wrong
DEMAND

1980 Forecast       Actual
(A Major Company)   1996

"CPE's"

Developing
Oth. Industrial
Japan
Europe
U.S.


Price
+50% Real
-45% Real
+1% Nominal

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1986 PRICE COLLAPSE VIEWED AS UNSUSTAINABLE. REVERSAL FORECAST IN 1990'S. ACTUAL PRICES FLAT IN NOMINAL, DOWN IN REAL DOLLARS
# World Demand Increase
(Excl. FSU, China, E. Europe)

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<tr>
<th>1986-1995</th>
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<tr>
<td>4.8 MMB/D</td>
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<tr>
<td>10.0 MMB/D</td>
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PROJECTED HIGH PRICES... PROJECTED LOW DEMAND GROWTH. ACTUAL PRICES MUCH LOWER... DEMAND GROWTH MUCH HIGHER.