

Cambridge

Energy

Contract

**SFIN**

**FILE**

**ALASKA STATE LEGISLATURE**  
**LEGISLATIVE BUDGET AND AUDIT COMMITTEE**  
Division of Legislative Finance




P.O. Box 113200  
Juneau, AK 99811-3200  
(907) 465-3795  
FAX (907) 463-4885

MEMORANDUM

DATE: March 22, 1995

TO: Senator Steve Frank  
Senator Rick Halford  
Senate Finance Committee Co-Chairs

Representative Mark Hanley  
Representative Richard Foster  
House Finance Committee Co-Chairs

FROM: Mike Greany   
Director  
Legislative Finance Division

SUBJ: Cambridge Energy Research Associates, Inc. Contract

The Cambridge Energy Research Associates, Inc. Contract is enclosed for your signatures. It has already been signed by Mr. Steve Hagggett, their Director of Marketing.

Along with our contract, CERA, Inc. attached a copy of their standard agreement. Terry Bannister, our Legal Services Attorney, said that we should not sign their agreement since that would be having two contracts. However, the purpose of sending the agreement was to remind us that direct expenses will be billed separately.

The direct expenses that they will be billing us for will be travel expenses for Ann-Louise Hittle who will be making the presentation on oil price and production forecasting here later this month.

CONTRACT BETWEEN  
STATE OF ALASKA  
SENATE FINANCE COMMITTEE  
HOUSE FINANCE COMMITTEE  
P.O. BOX 113200  
JUNEAU, ALASKA 99811-3200

and

CAMBRIDGE ENERGY RESEARCH ASSOCIATES, INC.  
20 UNIVERSITY ROAD  
CHARLES SQUARE  
CAMBRIDGE, MA 02138

\*\* CONTRACT AMOUNT -- \$15,750 \*\*

The parties to this agreement are the Senate Finance Committee and House Finance Committee, hereinafter jointly referred to as the "Division", and Cambridge Energy Research Associates, Inc., hereinafter referred to as the "Consultant".

THE PURPOSE OF THIS AGREEMENT is to provide the Senate and House Finance Committees with oil and gas related services and publications.

IT IS THEREFORE MUTUALLY AGREED THAT:

CLAUSE I -- STATEMENT OF WORK

The Consultant shall

(1) Provide the Division with a forecast to cover at least one-year of world oil prices, including Alaska North Slope crude oil prices. The Consultant shall present this forecast in person at a joint House/Senate Finance Committee meeting (to be held in March, 1995). Prior to this meeting the Consultant shall be available to the Division for regular phone consultation with the Division and provide the Division with any background charts and graphics necessary for the meeting.

(2) Provide the Division with 5 copies of the quarterly publication "World Oil Watch."

(3) Provide the Division with 5 copies, when released, of periodic Oil Reports. One copy of Fax Alerts will be sent to the Legislative Finance Division.

(4) Participate in one annual forecast presentation with the Legislature

(5) Provide the representatives of the Division regular phone access to follow up the yearly forecast meeting.

CLAUSE II -- PROJECT DIRECTOR

The project director shall be Michael Greany, Director, Legislative Finance Division.

CLAUSE III -- PERIOD AND DATES OF PERFORMANCE

The work under this Contract shall be performed from March 1, 1995 through February 28, 1996.

CLAUSE IV -- COMPENSATION AND METHOD OF PAYMENT

(a) For the services and publications specified in this Contract, the Consultant shall be compensated in the amount of \$15,750.00.

(b) A payment to the Consultant shall be based on proper billings provided by the Consultant to the division. All of the Procurement Officers must approve each billing before it may be paid.

(c) If payment is not made within 90 days after receipt by the Division of a proper billing submitted under (b) of this Clause, the Division shall pay interest on the unpaid balance of the billing at the rate of 1.5 percent per month from the date payment becomes due to the date payment is made. A payment is considered made on the date it is personally delivered or mailed to the Consultant.

(d) Total payments under this Contract shall not exceed Fifteen Thousand Seven Hundred and Fifty Dollars and No/100 Dollars (\$15,750). The Senate Finance Committee will pay \$7,875.00 and the House Finance Committee will pay \$7,875.00.

CLAUSE V -- RECORDS, DOCUMENTS

The documents, reports, writings, graphics, slides, charts, and other materials, generated as a consequence of work done under this Contract will be distributed as follows:

(1) One copy to each of the Co-chairs of the House and Senate Finance Committees and one copy to the Division of Legislative Finance.

(2) Materials prepared for the annual forecast presentation may be reproduced and made available to the public.

(3) No materials may be sold by the Division.

CLAUSE VI -- COVERAGE UNDER THE ETHICS LAW

The Consultant and its officers, shareholders, and employees may be subject to the provisions of AS 24.60 (Legislative Ethics) as legislative employees unless excluded from the definition of "legislative employee" under AS 24.60.990(10).

CLAUSE VII -- INSURANCE

The Consultant shall provide and maintain workers compensation insurance for Consultant's employees. Upon request, the Consultant shall provide the Division with evidence of the Consultant's compliance with this Clause.

CLAUSE VIII -- TERMINATION

(a) This Contract may be terminated by the Division upon delivery of written notice of the termination to the Consultant at the following address:

Cambridge Energy Research Associates, Inc.  
20 University Road  
Charles Square  
Cambridge, MA 02138

(b) If this Contract is so terminated under (a) and the termination is not based on a breach by the Consultant, the Consultant shall be compensated for the services, publications and items provided under the terms of this Contract to the date of termination if the Consultant provides the Division with a written report containing a description of any research or analyses performed, a statement of the result or conclusion formed based upon the research or analyses, and a copy of all data acquired by the Consultant or the Consultant's agents in conjunction with this Contract. If such compensation is less than any advance payment made under Clause IV, Paragraph (a), the Consultant agrees to refund the balance of the advance payment.

CLAUSE IX -- VENUE

In the event that the parties to this Contract find it necessary to litigate the terms of the Contract, venue shall be the State of Alaska, First Judicial District, at Juneau, and the Contract shall be interpreted according to the laws of Alaska.

CLAUSE X -- ASSIGNMENT

Assignment of this Contract is subject to Section 160 of the Legislature's Procurement Procedures.

CLAUSE XI -- CERTIFICATION

Execution of this Contract by the Director of the Legislative Finance Division or his designee hereby constitutes a certification that the funds have been appropriated and encumbered for the amount of this Contract.


CLAUSE XII -- MODIFICATIONS AND PREVIOUS AGREEMENTS

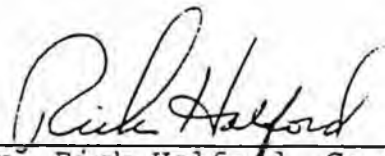
This Contract contains the entire agreement between the parties. A statement, promise or inducement made by a party or an agent of a party is not valid or binding unless the statement, promise or inducement is contained in this written Contract. This Contract may not be enlarged, modified, or altered except under written agreement signed by all parties to the Contract.

IN WITNESS WHEREOF, the parties have executed this agreement on the dates noted.

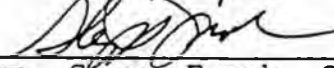
CONSULTANT  
CAMBRIDGE ENERGY  
RESEARCH ASSOCIATES, INC.

DIVISION

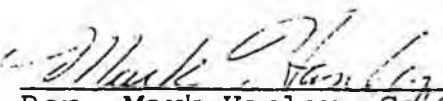
  
\_\_\_\_\_  
Steve Hagel  
Director of Marketing  
IRS Tax ID# 04-280-6111  
DATE: March 1 1995

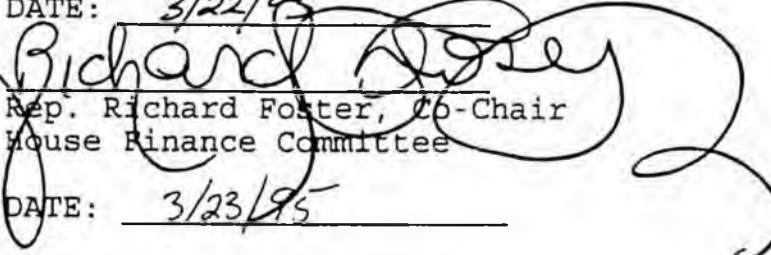
  
\_\_\_\_\_  
Sen. Rick Halford, Co-Chair  
Senate Finance Committee

DATE: 3/22/95

  
\_\_\_\_\_  
Sen. Steve Frank, Co-Chair  
Senate Finance Committee

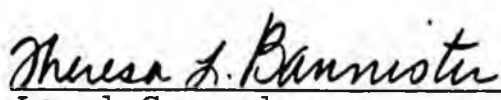
DATE: 3/22/95

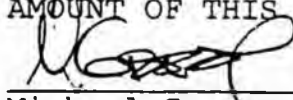
  
\_\_\_\_\_  
Rep. Mark Hanley, Co-Chair  
House Finance Committee  
DATE: 3/23/95

  
\_\_\_\_\_  
Rep. Richard Foster, Co-Chair  
House Finance Committee  
DATE: 3/23/95

APPROVED AS TO FORM:

CERTIFICATION THAT FUNDS  
HAVE BEEN APPROPRIATED  
AND ENCUMBERED FOR THE  
AMOUNT OF THIS CONTRACT

  
\_\_\_\_\_  
Theresa A. Bannister  
Legal Counsel  
Legal Services Division  
Legislative Affairs Agency  
DATE: 3-22-95

  
\_\_\_\_\_  
Michael Greany, Director  
Legislative Finance Division  
DATE: 3/22/95

# Cambridge Energy Research Associates, Inc.

Charles Square  
20 University Road  
Cambridge, Massachusetts 02138  
Telephone: (617) 497-6446  
Telex: 6714003 CERA UW  
Fax: (617) 497-0423

March 1, 1995

Mr. Mike Greany  
Leg. Finance Director  
Alaska State Legislature  
Legislative Finance Division  
State Capitol  
6th Avenue  
Juneau, AK 99801-1182

Dear Mr. Kulukundis:

Please find enclosed an invoice in the amount of \$15,750 for your World Oil retainer service with Cambridge Energy Research Associates. The enclosed invoice reflects the current term, direct expenses will be billed separately.

I have also enclosed two copies of our standard contract. Please review and sign the contract, and return one copy to Cambridge Energy Research Associates. The second copy may be retained for your records.

Please feel free to contact me with any questions or if I can be of service in any way.

Sincerely,



Ana Cherta McVay  
Marketing Administrator

enclosures

# Standard Agreement

This agreement "entered into" as of \_\_\_\_\_ between \_\_\_\_\_

Cambridge Energy Research Associates, Inc.,  
20 University Road, Charles Square, Cambridge, MA 02138,

hereafter referred to as "CERA," and:

Alaska State Legislature

along with offices and subsidiaries listed as follows:

hereafter referred to as "Client," will serve as the Master Retainer Client Agreement, the Terms and Conditions of Service which will apply to all current and future Service Agreements established between CERA and the Client.

## TERMS AND CONDITIONS OF SERVICE

1. *Services.* CERA will provide the Client with Retainer Advisory Services as set forth on the attached CERA Retainer Services Advisory Worksheet (the "Worksheet") for the annual purchase price specified thereon.
2. *Term and Renewal.* This service shall commence 3/1/95 (month/year) and continue for a term of one year. The service will automatically renew annually thereafter unless notice of intention to terminate is received in writing from either party at least 30 days prior to the annual renewal date. Prices are subject to change at the time of renewal. CERA will also notify Client of any such price change at least 30 days prior to the annual renewal date.
3. *Cancellation.* This Agreement may be cancelled upon 30 days prior written notice by either party for material breach of this Agreement by the other party, unless such breach is cured in such 30-day period.
4. *Payment.* The annual purchase price payable to CERA under this Agreement is the sum in U.S. dollars as set forth on the Worksheet. The annual purchase price is payable upon receipt of invoice from CERA. Expenses incurred by CERA in the performance of site visits, presentations, conference calls and/or other special services, under this Agreement, including, but not limited to, travel, lodging, meals, communications, production, and reasonable administrative expenses will be billed separately by CERA to Client as incurred. Such billings for expenses are payable upon receipt.
5. *No Warranty.* The information to be supplied by CERA in accordance with this Agreement shall be obtained from sources which CERA believes to be reliable but in no way is warranted by CERA as to accuracy or completeness. CERA makes no warranties, whether express or implied, written or oral, with respect to the services and information to be provided to Client under this Agreement.
6. *Proprietary Material.* The parties agree that the material to be supplied by CERA is proprietary and confidential to CERA and copyrighted. All rights are reserved to CERA. No part of the material supplied by CERA shall be reproduced in any form or by an electronic or mechanical means, including but not limited to information storage and retrieval systems, without permission in writing from CERA. Client shall use its best efforts to prevent reproduction. Client shall not provide any part of the materials or information supplied by CERA to any other entity or third party, including but not limited to public media outlets, other companies, government agencies, suppliers, investors, or customers of the Client.

Client agrees that any information provided to CERA which Client deems to be of a confidential nature shall be communicated to CERA only if it is preceded by a statement that such information is Client confidential. In the event that any written communications are delivered to CERA and the Client wants such communications to be deemed confidential, then such information shall be clearly stamped as Client confidential.

7. *Securities Industry.* Client agrees not to supply any CERA proprietary material, or restatement thereof, to any person who is professionally involved in the trading of securities, brokerage, or investment banking, or research done in support of securities, brokerage, or investment banking, whether or not they are employed by Client. The conveyance of any such information by Client shall be grounds for the termination of this Agreement, which shall not be CERA's exclusive remedy.
8. *Scope of Services.* Client acknowledges that CERA is neither an "investment advisor" under the Investment Advisors Act of 1940 or a "commodity trading advisor" under the Commodity Exchange Act and, accordingly, the CERA Retainer Advisory Services shall not include advice with respect to the value of, or the advisability of trading in, commodities futures contracts or securities of particular companies or groups of companies within a particular market sector.
9. *Service Agreement(s).* The specific services to be provided by CERA under this agreement are included in the attached Enrollment Forms. Additional services may be purchased by Client and added to the Enrollment Forms at any time upon mutual agreement of CERA and Client.
10. *Miscellaneous.* This Agreement shall be governed by and construed in accordance with the laws of the Commonwealth of Massachusetts. This Agreement constitutes the entire agreement between the parties. No waiver, consent, modification or change of terms of this Agreement shall bind either party unless in writing signed by both parties.

CAMBRIDGE ENERGY RESEARCH  
ASSOCIATES (CERA)

CLIENT: \_\_\_\_\_

BY: Steve Haggitt

Name: Steve Haggitt

Title: Director

DATE: March 1 1995

BY: \_\_\_\_\_

Name:

Title:

DATE: \_\_\_\_\_

Please return this agreement to:  
Cambridge Energy Research Associates  
20 University Road  
Cambridge, MA 02138



STATE OF ALASKA  
LEGISLATIVE FINANCE DIVISION  
PROCUREMENT PROCEDURES FORM

Original  
forwarded  
to Kirsten  
3/28/95

AUTHORIZATION OF CONTRACT

On \_\_\_\_\_, 1995, a contract between Cambridge Energy Research Associates and the House and Senate Finance Committees in the amount of \$15,750.00 for the purpose of providing oil and gas related services and publications was authorized by the majority of the House and Senate Finance Committees whose signatures appear below:

SIGNED John A. King

SIGNED \_\_\_\_\_

TITLE Senator

TITLE \_\_\_\_\_

DATE March 28, 1995

DATE \_\_\_\_\_

SIGNED \_\_\_\_\_

SIGNED \_\_\_\_\_

TITLE March 28, 1995

TITLE \_\_\_\_\_

DATE Senate District 4

DATE \_\_\_\_\_

SIGNED David Donley

SIGNED \_\_\_\_\_

TITLE Senator

TITLE \_\_\_\_\_

DATE 3/28/95

DATE \_\_\_\_\_

SIGNED Paul F. Ziegler

SIGNED \_\_\_\_\_

TITLE Senator Dist. C

TITLE \_\_\_\_\_

DATE 3-28-95

DATE \_\_\_\_\_

SIGNED Bert Sharp

SIGNED \_\_\_\_\_

TITLE Senator Dist P.

TITLE \_\_\_\_\_

DATE 3-28-95

DATE \_\_\_\_\_

SIGNED Stephen Merrill

SIGNED \_\_\_\_\_

TITLE Senator

TITLE \_\_\_\_\_

DATE 3-28-95

DATE \_\_\_\_\_

SIGNED Rich Halford

SIGNED \_\_\_\_\_

TITLE SFC Co. Ch.

TITLE \_\_\_\_\_

DATE 3-28-95

DATE \_\_\_\_\_

SIGNED \_\_\_\_\_

SIGNED \_\_\_\_\_

TITLE \_\_\_\_\_

TITLE \_\_\_\_\_

DATE \_\_\_\_\_

DATE \_\_\_\_\_

# ALASKA STATE LEGISLATURE


## LEGISLATIVE BUDGET AND AUDIT COMMITTEE

Division of Legislative Finance



P.O. Box 113200  
Juneau, AK 99811-3200  
(907) 465-3795  
FAX (907) 463-4885

April 4, 1995

TO: Senator Steve Rieger  
FROM: Michael Greany   
Legislative Fiscal Analyst

Re: Cambridge Energy Research Associates Response to  
Your Questions at the March 29, 1995 Presentation

Forwarded in the attachment is their response which we are  
also making available to the other committee members.

Attachment.

cc: Co-Chairs and Members  
House and Senate Finance Committees

# Cambridge Energy Research Associates, Inc.

20 University Road • Cambridge, MA • 02138 • 617/497-6446 • fax 617/497-0423

TO Senator Steve Rieger  
Alaska State Legislature

April 3, 1995  
Date:

FAX:

FROM: Ann-Louise Hittle  
Director, World Oil  
Cambridge Energy Research Associates

TOTAL PAGES INCLUDING COVER PAGE:

*CONFIDENTIALITY NOTE: This teletype contains confidential information. The message is intended solely for the use of the individual or entity to whom it is addressed. Unauthorized use, disclosure or copying is prohibited. In the event of a transmission error please call CERA at 1-800-879-2372 or fax (617) 497-0423. Thank you.*

Re: Response to your questions at my testimony on March 29, 1995

**1. What are the reserves of Badami and other "String of Pearls" fields?"**

The North Star Complex (including Seal Island and others)  
Badami  
Kuvlum  
are each expected to be about 150-300 million barrels in reserves.

**2. What will the reserves be in the year 2010 of key Middle East OPEC producers?**

Despite increasing production levels into the next century, reserves of the key Middle East OPEC countries are expected to be either equal to or higher than current levels by 2010. However, the reserves in 2010 will depend upon the emphasis of exploration versus development and the availability of funds to adequately explore and develop the region. This outlook is due to the fact that many large fields have not as yet been developed and their reserves are not terribly well known until more development takes place. In addition, this area is characterized by extremely high undiscovered potential (in fact, the undiscovered potential of Iraq exceeds that of Saudi Arabia).

3/29/95  
Joint  
11/3  
Finance

# Alaska State Legislature

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March 29, 1995  
Juneau

CONFIDENTIAL

**Cambridge Energy Research Associates**

## **Overview**

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### **Oil Outlook Through 1996**

- Oil Demand
- Non-OPEC Supply
- OPEC Production and Politics
- The Oil Price Outlook

### **Crude Quality Differentials**



### **E&P Productive Capacity**

### **The Longer Term: Beyond 1996**

- Scenarios

## **Oil Outlook Through 1996**

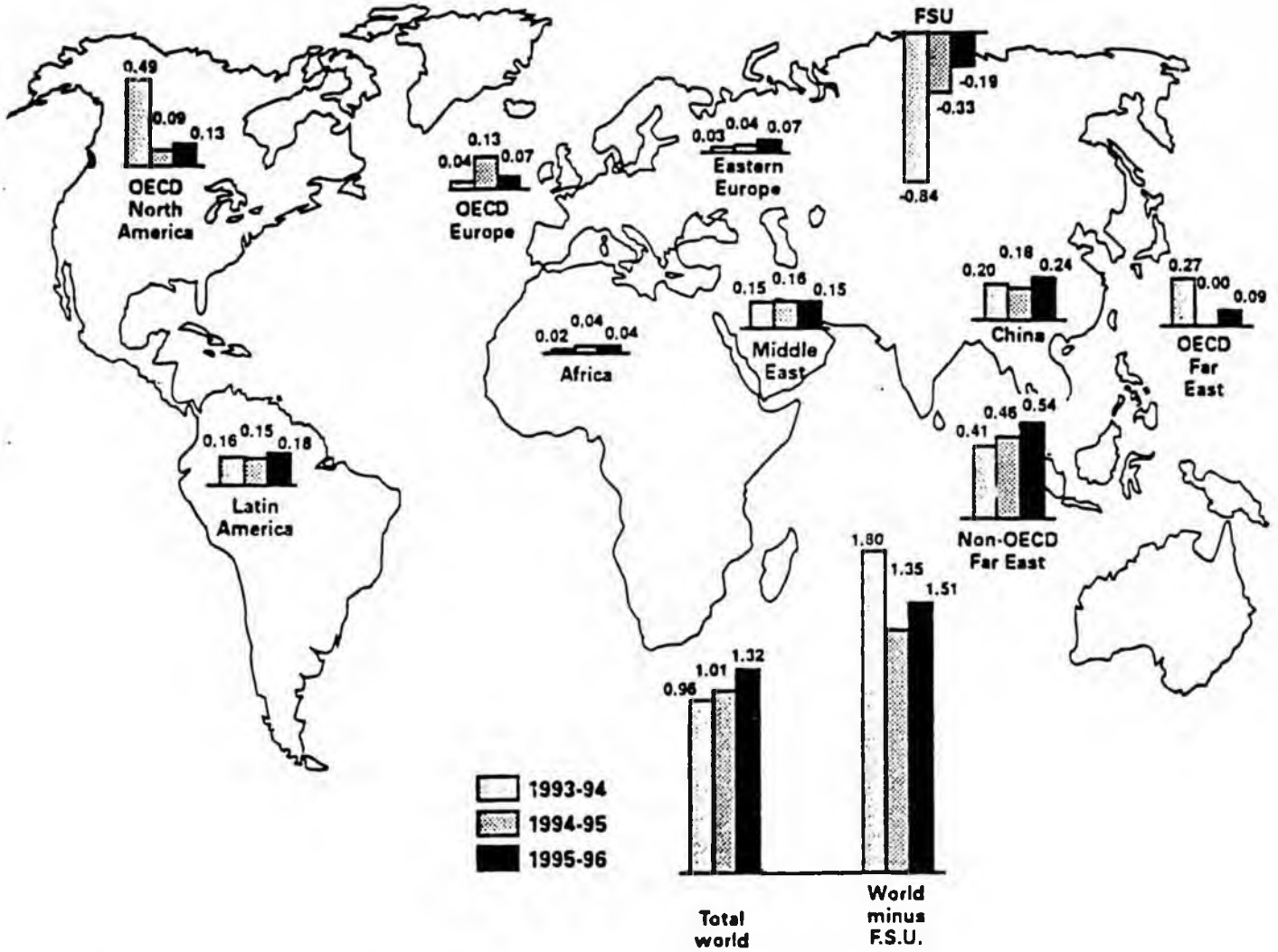
**NEW OIL MARKET REALITIES**  
**The World Economy: The Implications**  
**for Oil Demand in 1995/96**

Economic Growth Scenarios	Annual Oil Demand Growth (mbd)
 <p><b>Strong economic convergence</b></p>	<p>0.9 to 1.1 mbd in 1995            1.1 to 1.4 mbd in 1996</p>
<p><b>THE KEY</b>            Interest rates            Far East growth            Preventing China from overheating            U.S./Europe anti-inflation policy</p>	
 <p><b>Weak economic convergence</b></p>	<p>0.6 to 0.7 mbd in 1995            0.8 to 1.0 mbd in 1996</p>

## NEW OIL MARKET REALITIES

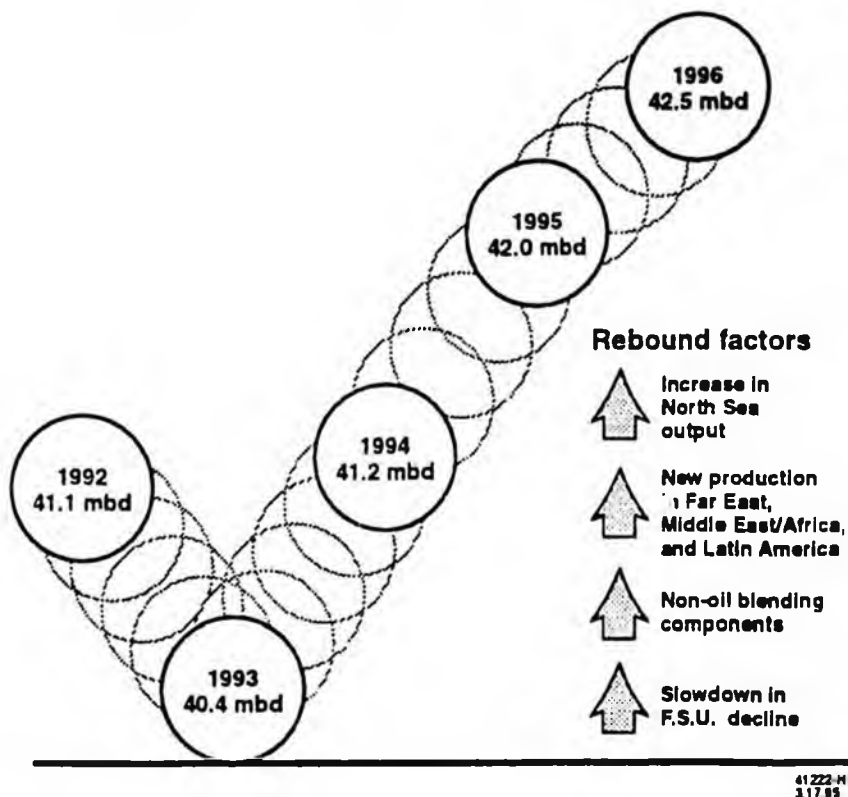
### Changes in Oil Demand by Region: Taking off the F.S.U. "Mask"

(mbd)



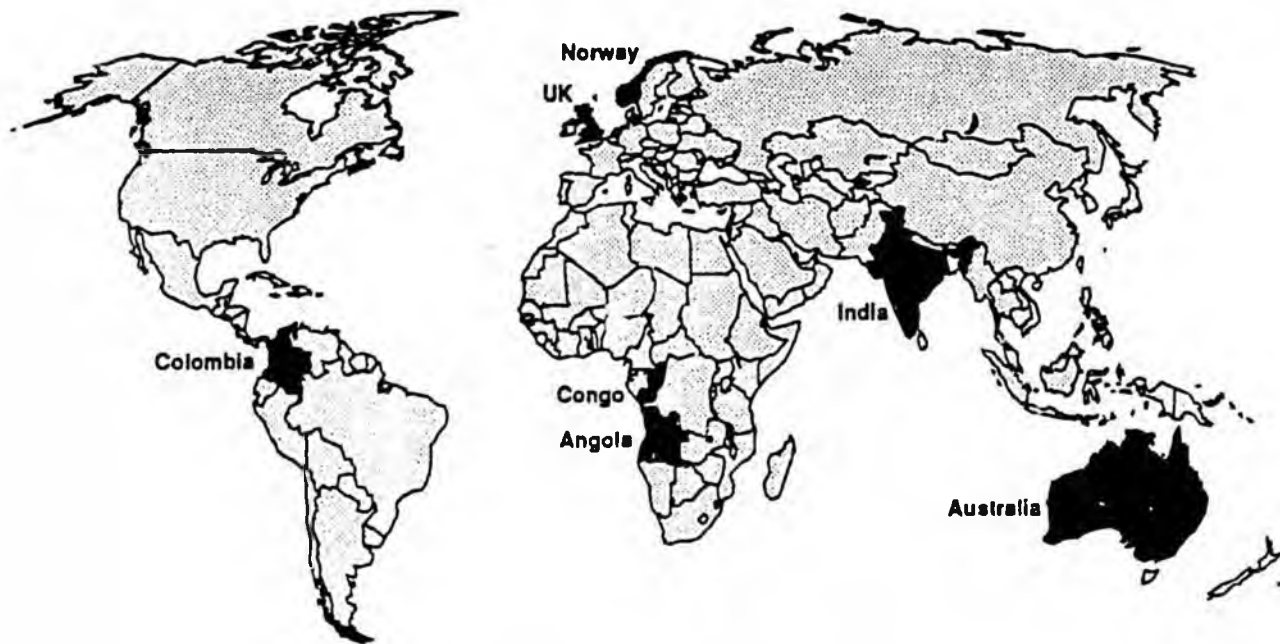
Source: Cambridge Energy Research Associates.

### Non-OPEC Supply: The Rebound



Source: Cambridge Energy Research Associates.

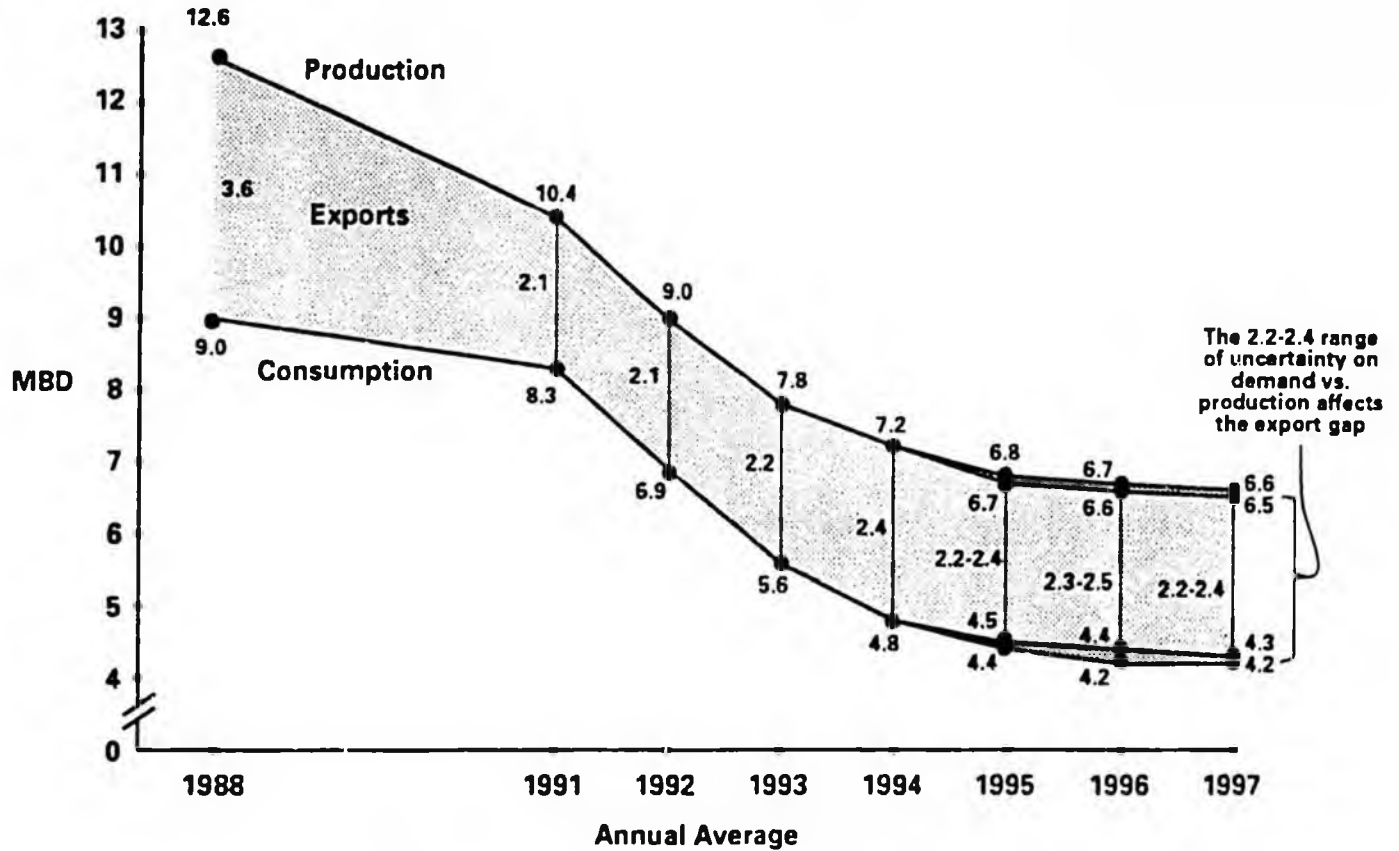
## NEW OIL MARKET REALITIES 1995: Another Banner Year for Non-OPEC



**Net additions: +0.8 to 0.9 mbd**

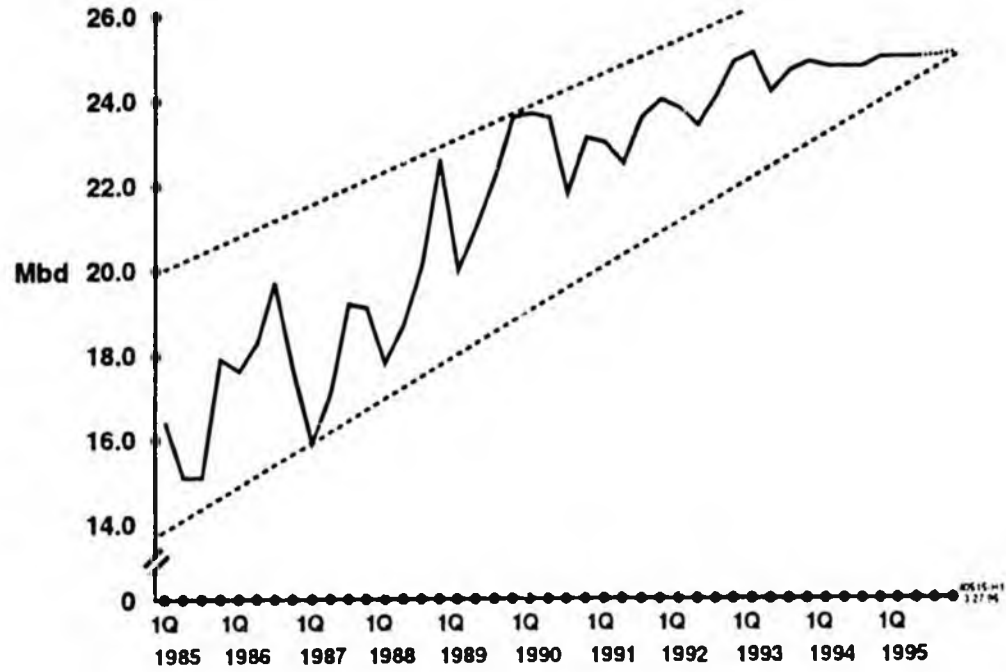
Source: Cambridge Energy Research Associates.

**NEW OIL MARKET REALITIES**  
**F.S.U. Production vs. Consumption:**  
**Exports Continue, but Timing Is Erratic**



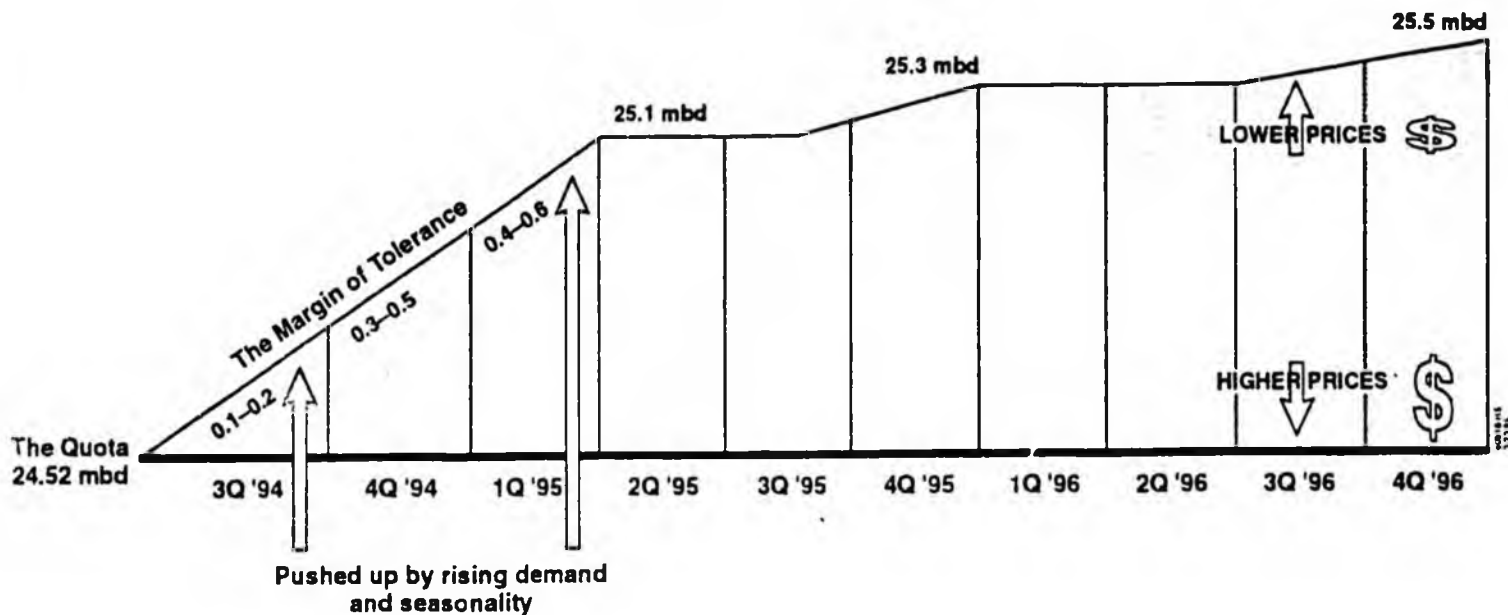
Source: Cambridge Energy Research Associates.  
 Note: Numbers may not add due to rounding.

### OPEC Production 1Q 1985 to 4Q 1995



Source: Cambridge Energy Research Associates.

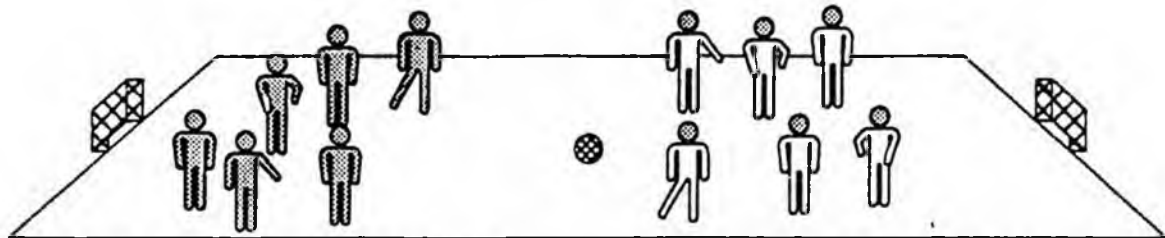
### OPEC Overproduction and the Margin of Tolerance: OPEC at the Outer Edge



Source: Cambridge Energy Research Associates.

# NEW OIL MARKET REALITIES The OPEC Playing Field: Past and Future

## Pre-1995

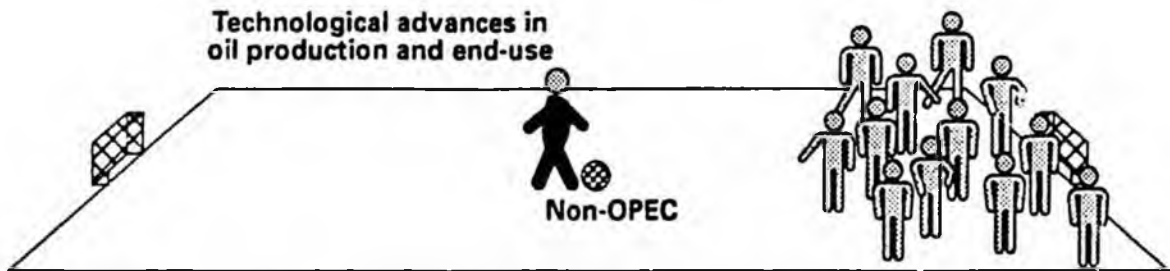


Volume/Capacity Reality Team

The High Price Team

Different teams seeking to set ground rules of oil supply and price

## Post-1995



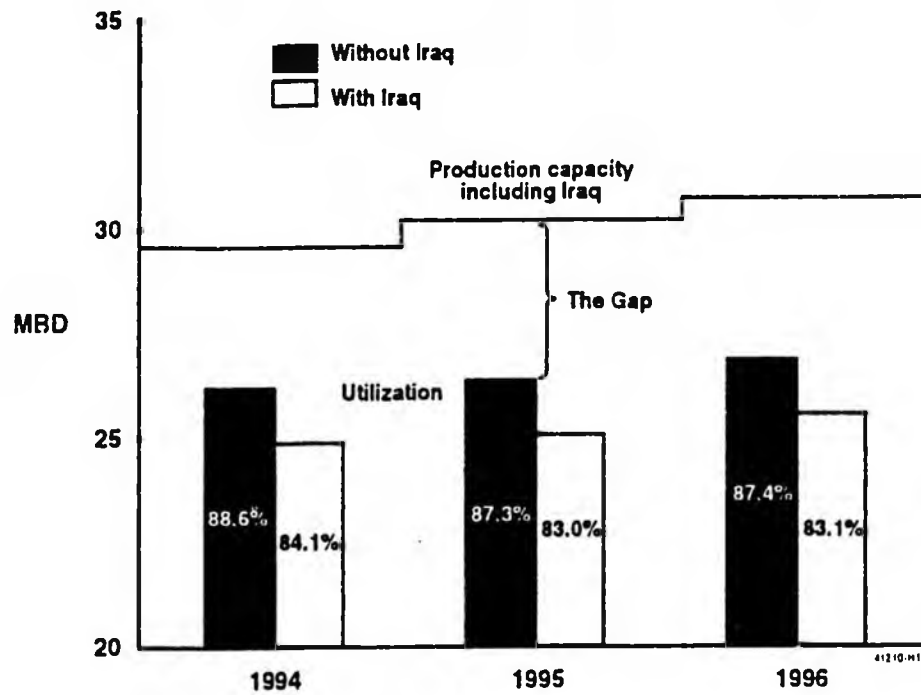
Technological advances in oil production and end-use

Non-OPEC

Twelve individual players loosely united by opposition to "too-low" prices they no longer control, and by fear of consequent domestic social/political upheaval

Source: Cambridge Energy Research Associates.

## The OPEC Utilization Gap: With and Without Iraq

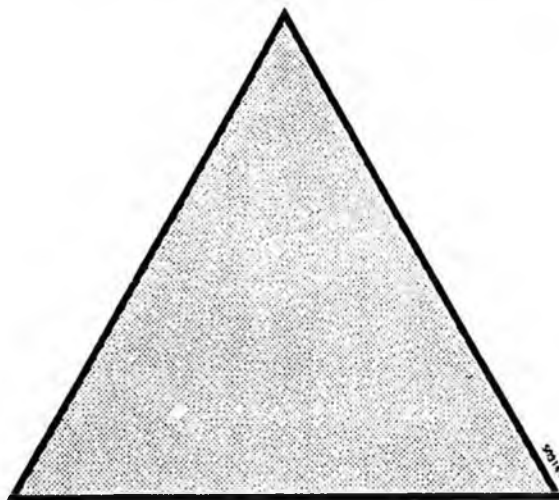


Source: Cambridge Energy Research Associates.

## Iraqi Re-entry: The Triangle of Competition

### New Iraqi Oil

- The uncertainty of timing and volumes



### OPEC Oil

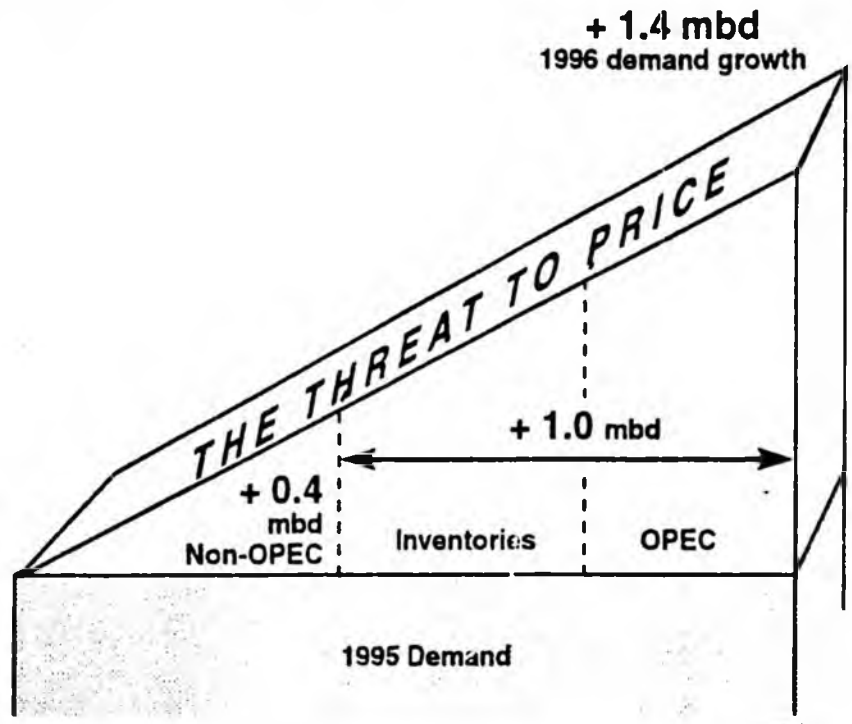
- Unlikely to reduce current 24.52 mbd quota after sanctions are lifted
- May attempt to reduce output from recent levels to accommodate Iraq

### World Inventories

- Early reduction of inventory levels would lessen price impact of Iraqi start-up

Source: Cambridge Energy Research Associates.

### OPEC in 1996: The Inventory Threat

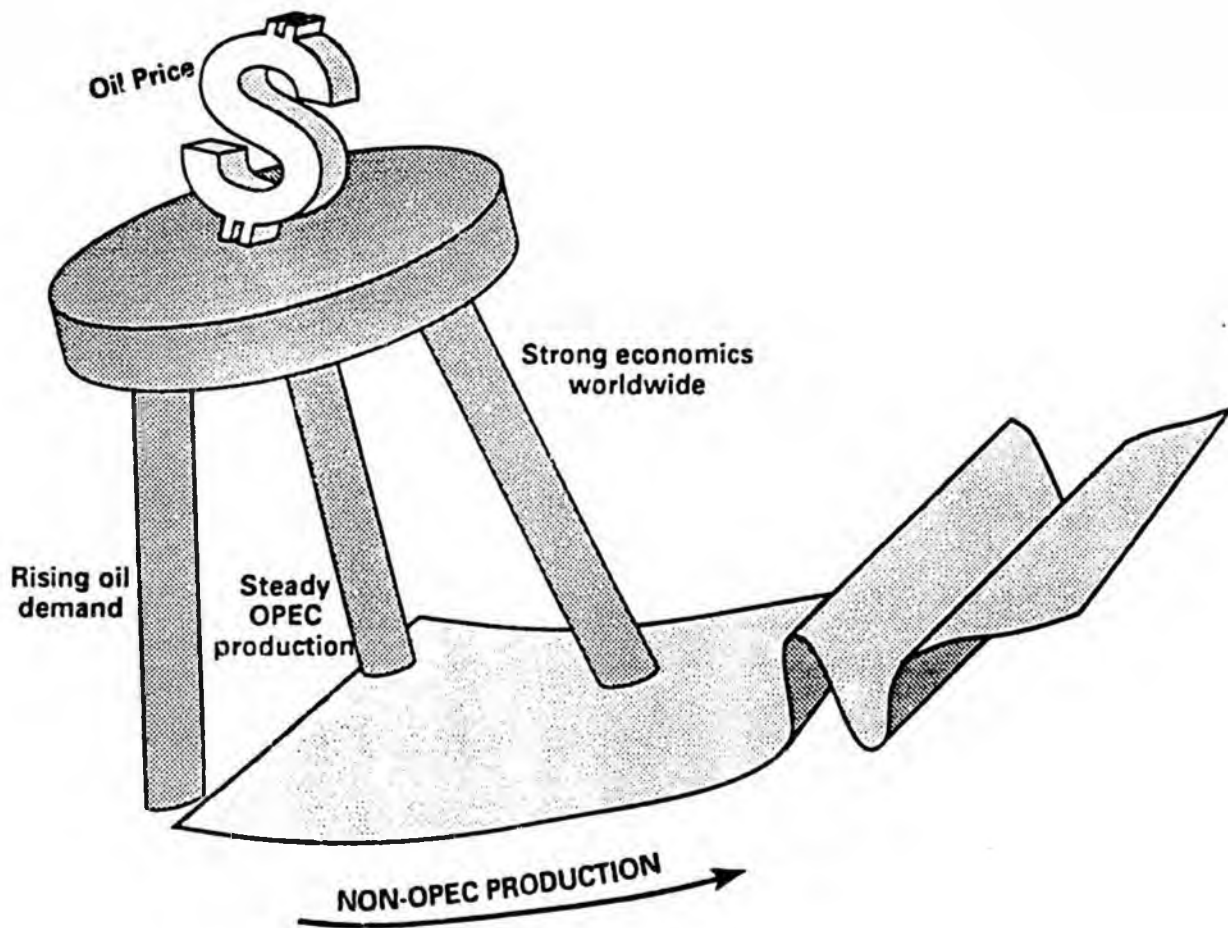


41222-H5  
3.24.96

Source: Cambridge Energy Research Associates.

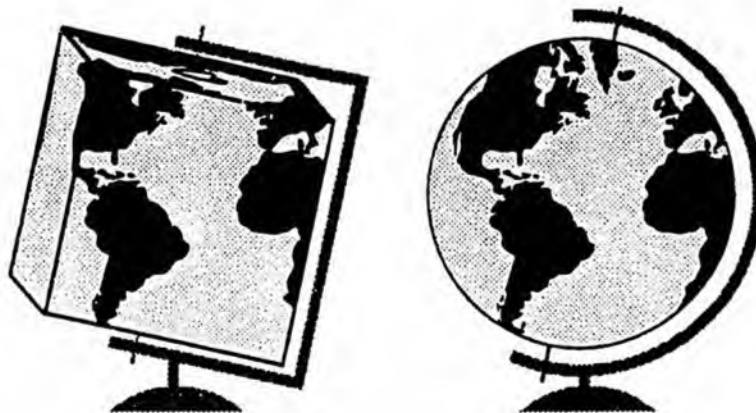
# NEW OIL MARKET REALITIES

## Non-OPEC Production: Destabilizing Oil Price Support



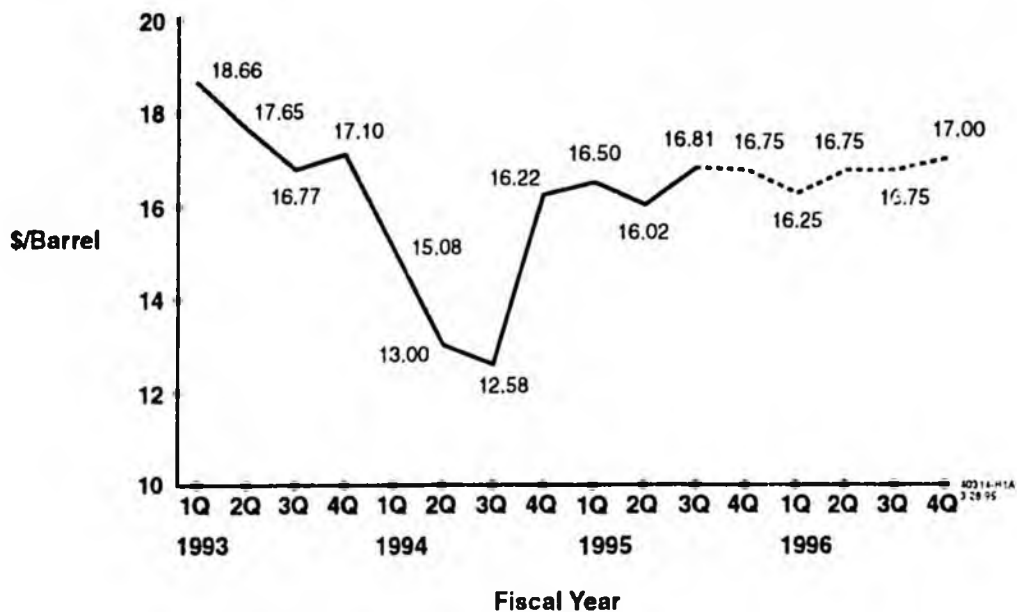
Source: Cambridge Energy Research Associates.

NEW OIL MARKET REALITIES  
**The New Price Seasonality**



Quarter	Old World	New World
1	Strong	Weak
2	Weak	Strong
3	Strengthening	Stronger
4	Strong	<b>Weakening  late in quarter  (unless a good cold snap  before December)</b>

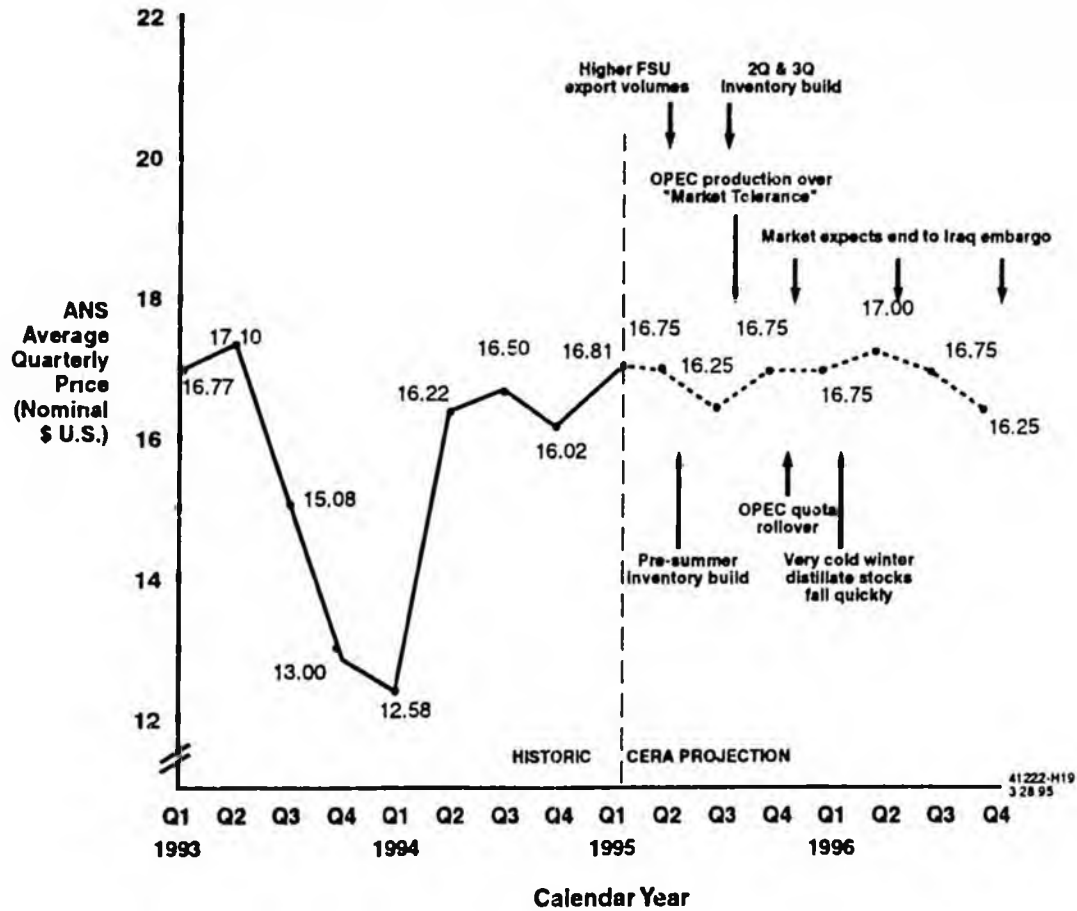
### ANS Price Outlook\*



\*Weighted 85% California/15% U.S. Gulf Coast

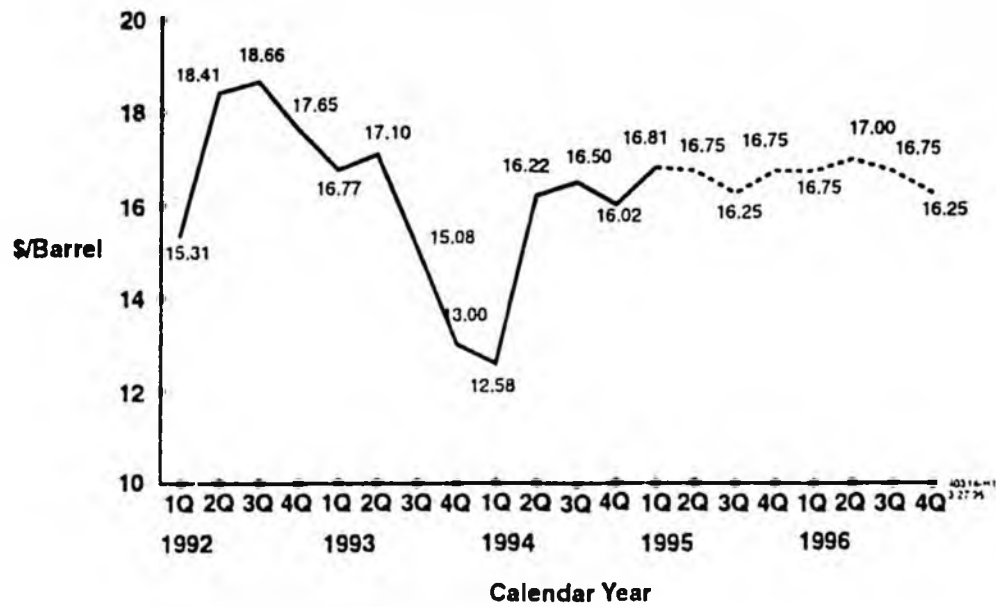
Source: Cambridge Energy Research Associates.

## NEW OIL MARKET REALITIES The 1993-96 Oil Price Environment



Source: Cambridge Energy Research Associates.

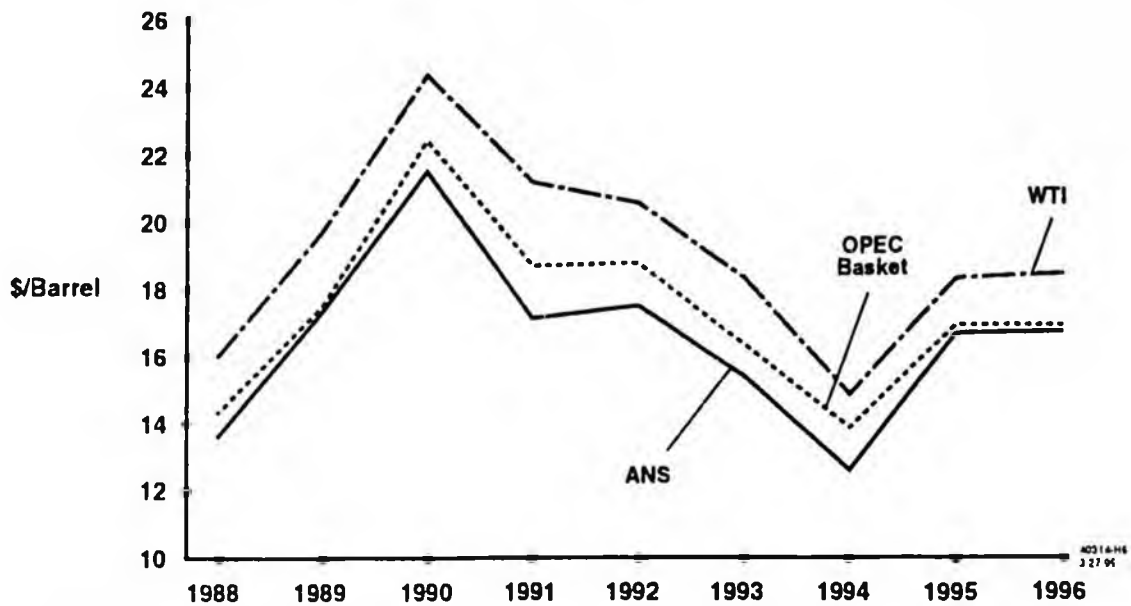
### ANS Price Outlook\*



\*Weighted 85% California/15% U.S. Gulf Coast

Source: Cambridge Energy Research Associates.

### Oil Prices (Calendar Year)



	1988	1989	1990	1991	1992	1993	1994	1995	1996
ANS*	13.54	17.27	21.51	17.10	17.48	15.37	12.55	16.65	16.70
WTI	15.94	19.68	24.36	21.17	20.55	18.31	14.81	18.30	18.44
OPEC Basket	14.25	17.43	22.42	18.67	18.74	16.32	13.81	16.90	16.90

\*Weighted 85% California/15% U.S. Gulf Coast

Source: Cambridge Energy Research Associates.

NEW OIL MARKET REALITIES  
**The Spring/Summer 1995 Price Triangle**

**Physical Fundamentals:**

**POSITIVE**

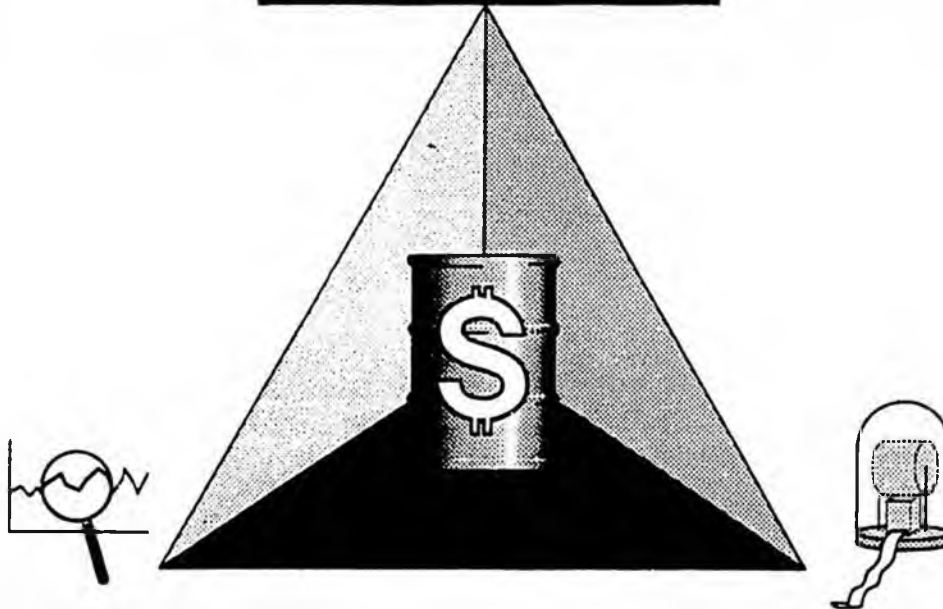
- Increasing demand
- Strong economic growth

**DEMAND**

**SUPPLY**

**NEGATIVE**

- Rising non-OPEC production
- Weak oil product prices



**Technical Chart Analysis:  
 The Strength of Volatility**

- Fearing too low a price  
 in a growing market

**Market Psychology:  
 The Tone of Volatility**

**POSITIVE**

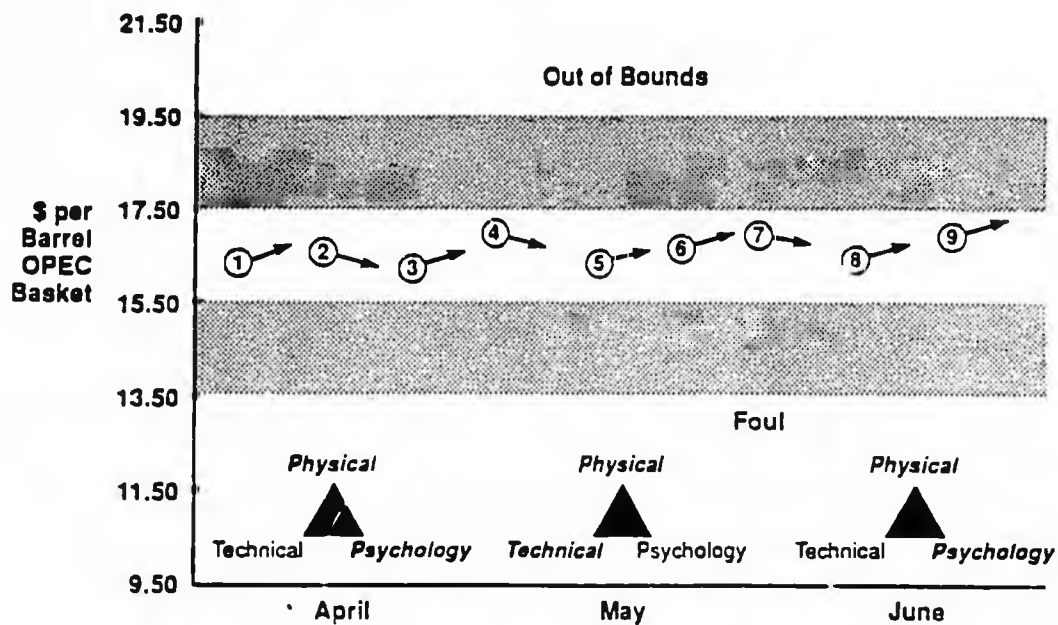
- Doubting Iraq's return
- OPEC production  
 discipline

**NEGATIVE**

- Fearing Iraq's return
- No security-of-supply  
 concerns

Source: Cambridge Energy Research Associates.

## The Signposts and the Price Playing Field: Second Quarter 1995



- |   |   |
|---|---|
| 1. End of refinery maintenance            | 6. Rising demand spurs technical buying                   |
| 2. UN Report on Iraqi Compliance          | 7. Perception of high non-OPEC output                     |
| 3. US reiterates tough anti-Iraq position | 8. June 19 meeting: OPEC decision to keep quota unchanged |
| 4. Higher FSU exports                     | 9. Japanese electric power oil demand adds price support  |
| 5. North Sea maintenance programs begin   |   |

Source: Cambridge Energy Research Associates.

## **Crude Quality Differentials**

## **The Playing Field of Crude Quality Price Differentials**

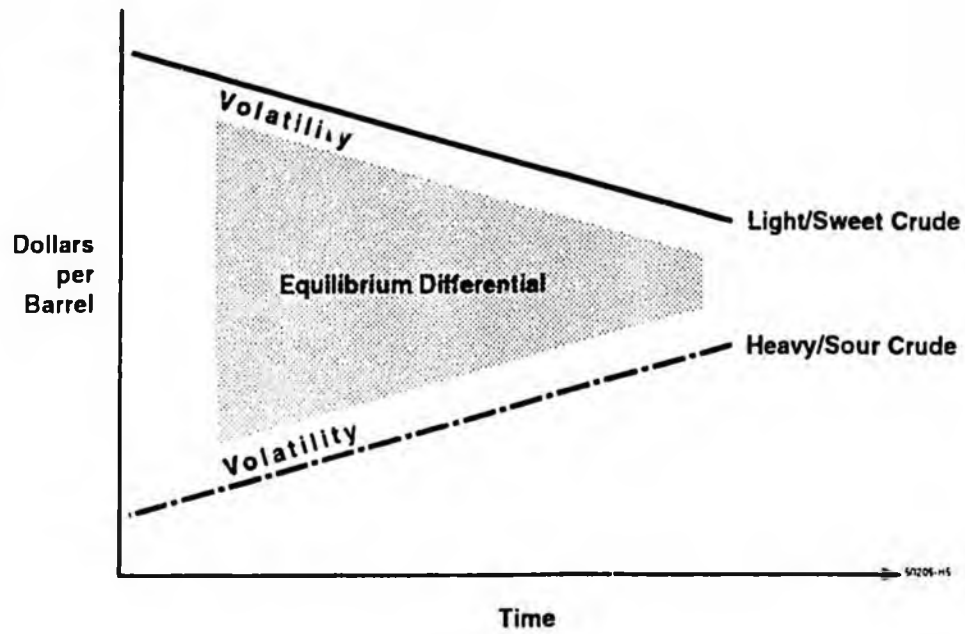
Four underlying factors narrow the range.

- Technological evolution: the oldest differential reducer
- Economies of scale: the over-capacity conundrum
- Changing product demand barrel: profitably but challenging
- Environmental regulation: new rules leave their mark

But not

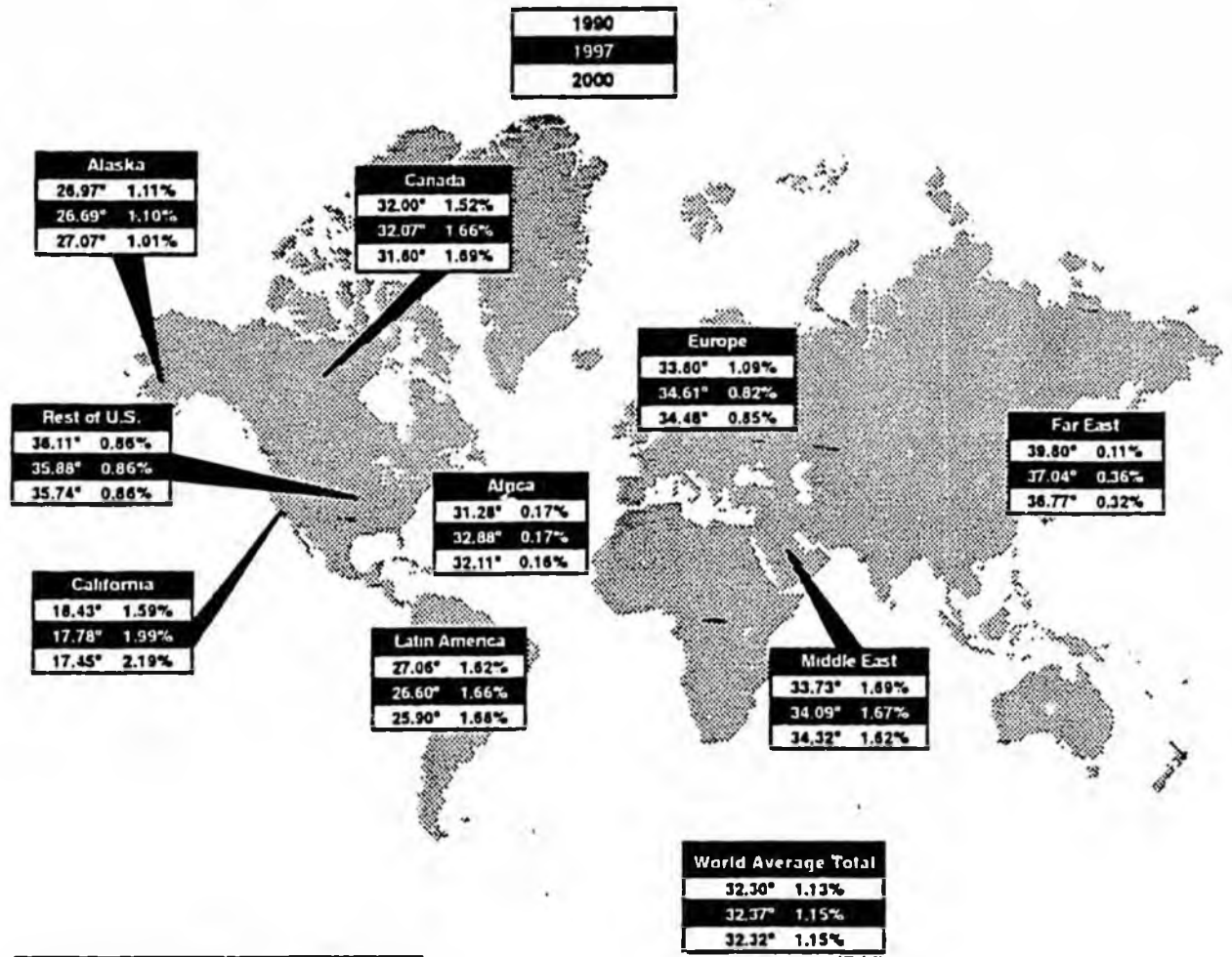
- Change in crude quality

### Emerging Market Trends Will Tend to Keep Future Differentials Narrow



Source: Cambridge Energy Research Associates.

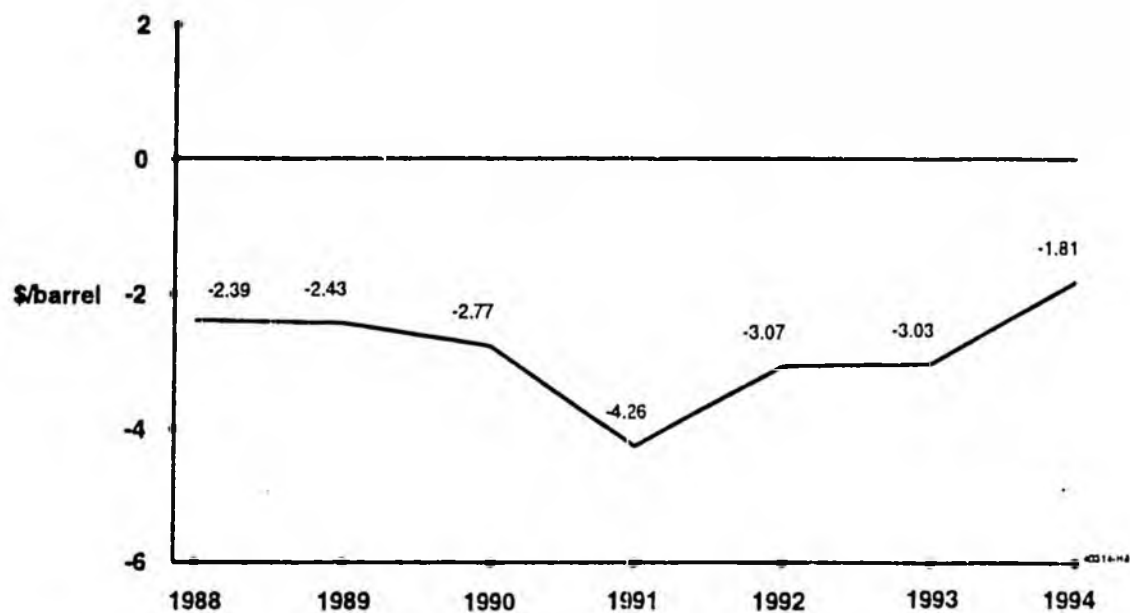
**World Crude Oil Quality**  
**Weighted Average Gravity (degrees API) and Sulfur Content (%)**



Source: Cambridge Energy Research Associates.

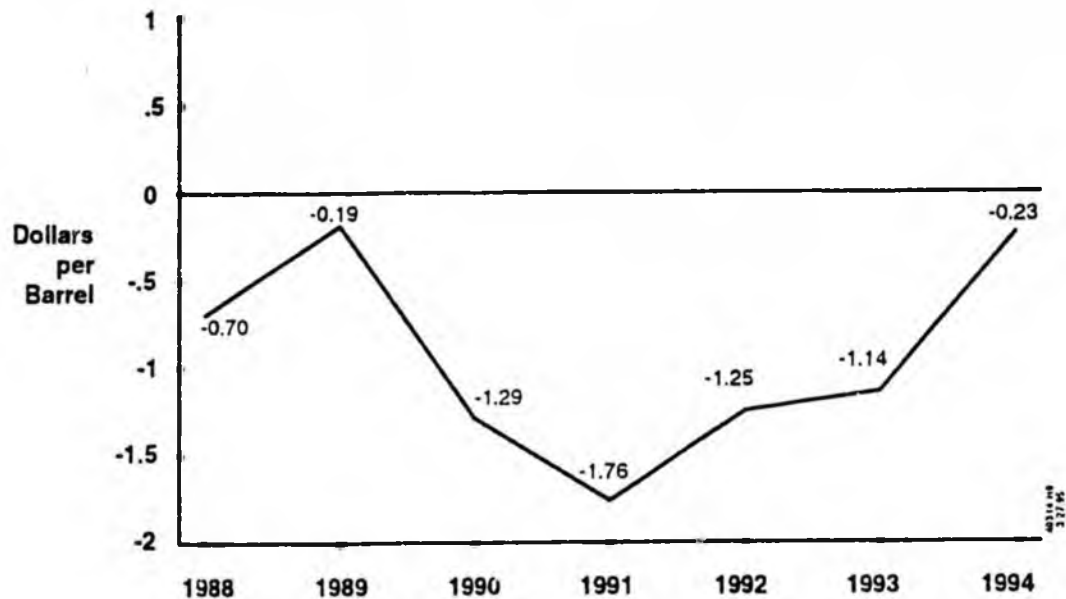
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### ANS Minus WTI (Annual Basis)



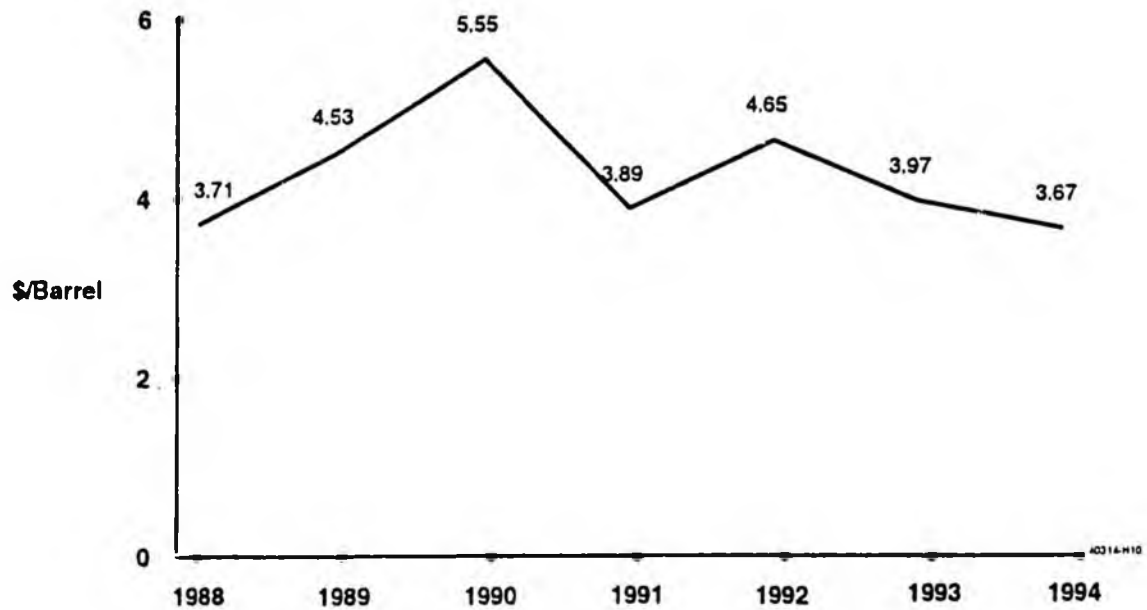
Source: Cambridge Energy Research Associates.

### ANS Minus OPEC Basket (Annual Basis)



Source: Cambridge Energy Research Associates.

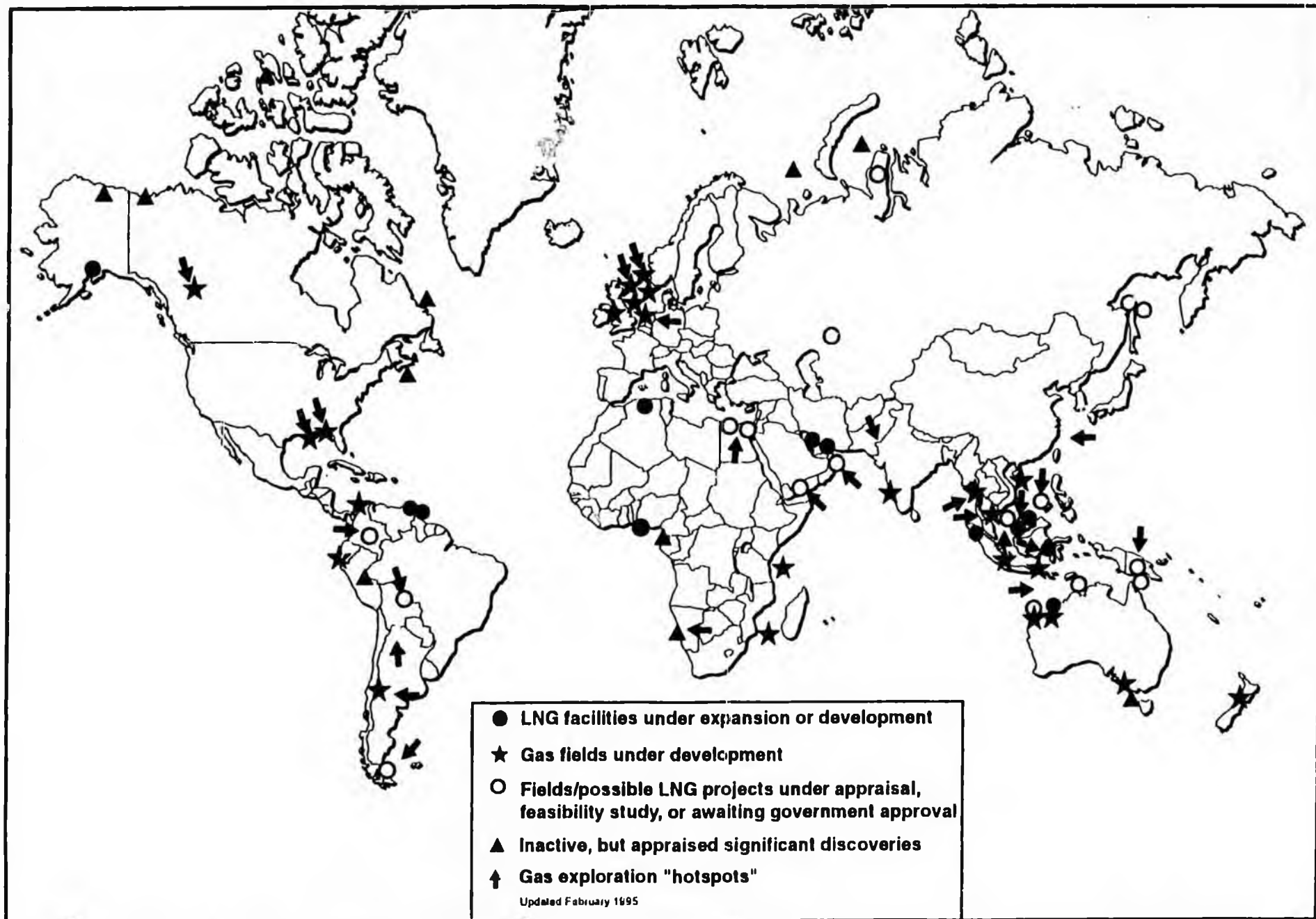
### ANS Minus Kern River (Annual Basis)



Source: Cambridge Energy Research Associates.

## **E&P—Productive Capacity**

## The Shift to Gas



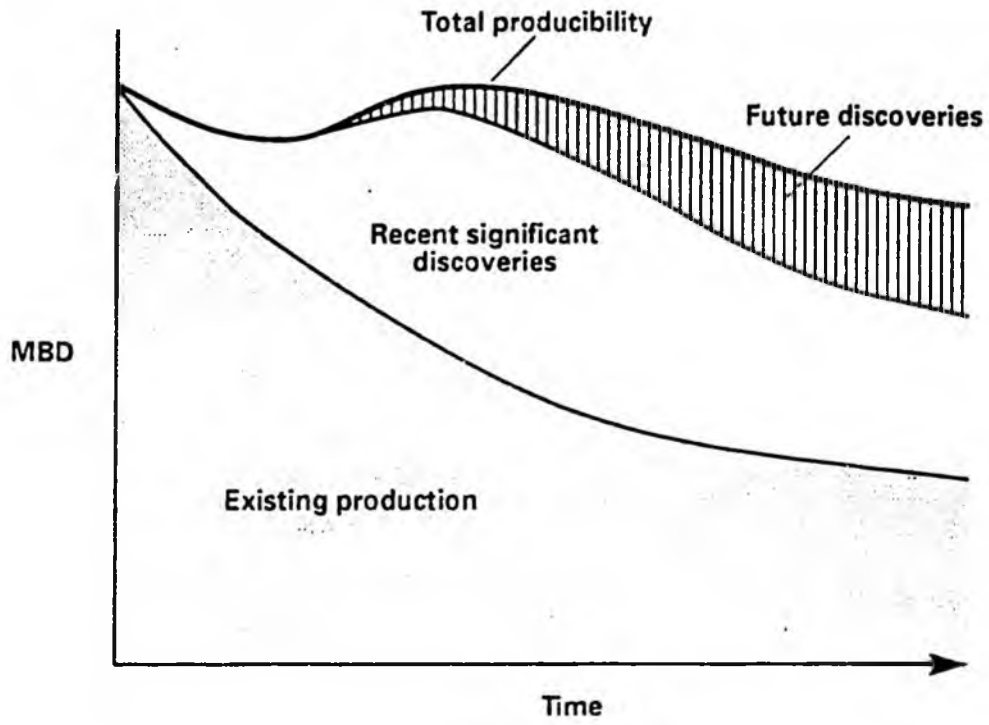
Source: Cambridge Energy Research Associates.

Cambridge Energy Research Associates...

23



### Components of Producibility



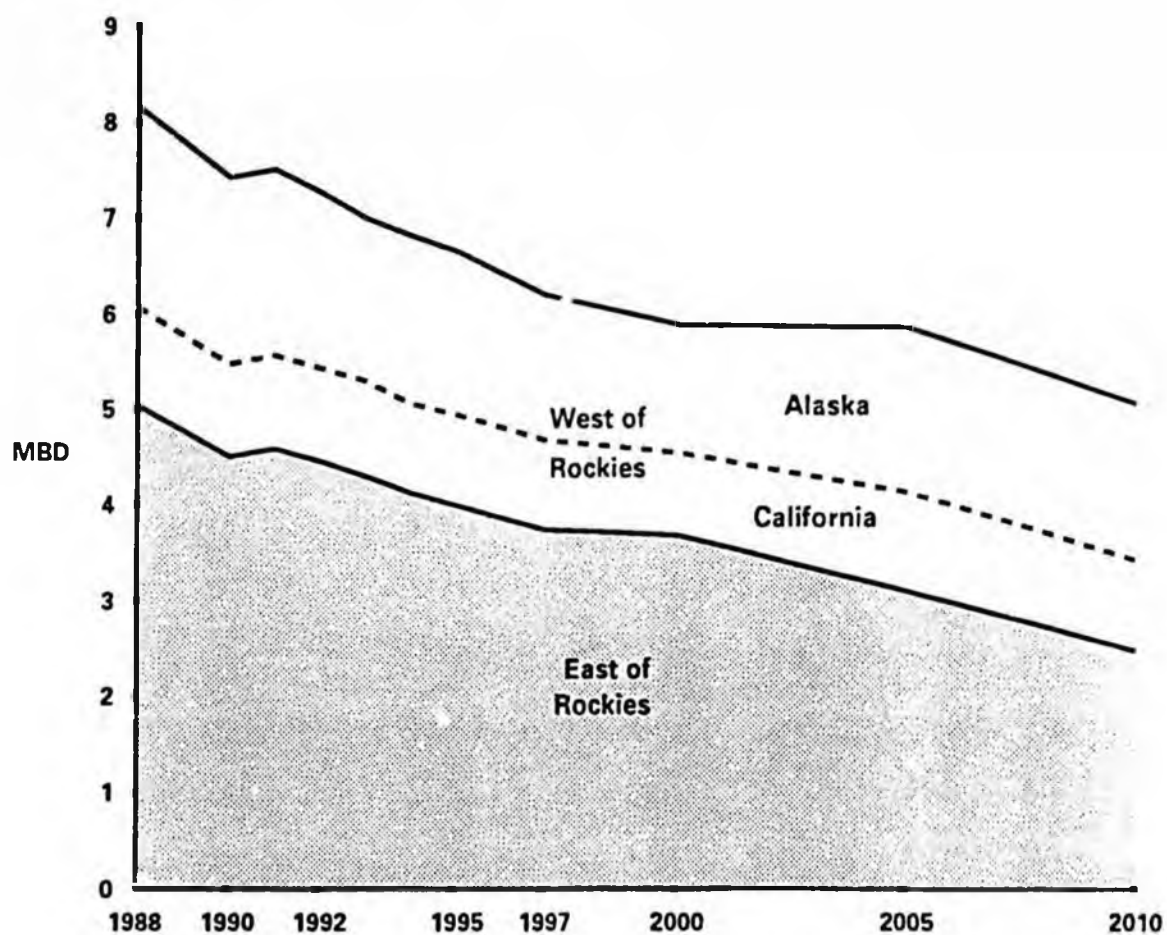
**World Liquid Productive Capacity  
(million barrels per day)**

	1990	1991	1992	1993	1994	1995	1996	1997	2000	2005	2010
<b>Non-OPEC</b>											
U.S.	9.0	9.2	9.0	8.8	8.5	8.3	8.0	7.8	7.5	7.4	6.4
Non-U.S.	20.3	20.8	21.1	22.0	23.6	24.5	25.3	26.0	26.4	24.5	23.4
<b>Subtotal</b>	<b>29.3</b>	<b>30.0</b>	<b>30.1</b>	<b>30.8</b>	<b>32.1</b>	<b>32.8</b>	<b>33.3</b>	<b>33.8</b>	<b>33.9</b>	<b>31.9</b>	<b>29.8</b>
FSU	11.4	10.3	8.9	7.8	7.1	6.7	6.4	6.2	6.5	7.5	10.0
Eastern Europe	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.4	0.5
<b>Subtotal</b>	<b>11.7</b>	<b>10.6</b>	<b>9.2</b>	<b>8.1</b>	<b>7.4</b>	<b>7.0</b>	<b>6.7</b>	<b>6.5</b>	<b>6.8</b>	<b>7.9</b>	<b>10.5</b>
<b>Total Non-OPEC</b>	<b>41.0</b>	<b>40.6</b>	<b>39.3</b>	<b>38.9</b>	<b>39.5</b>	<b>39.8</b>	<b>40.0</b>	<b>40.3</b>	<b>40.7</b>	<b>39.8</b>	<b>40.3</b>
<b>OPEC</b>											
Gulf Countries	19.4	16.9	18.5	20.2	21.0	21.7	22.3	23.2	25.2	27.9	32.1
Gulf NGLs	0.8	0.7	0.8	0.9	1.0	1.0	1.0	1.2	1.6	2.3	3.1
Other OPEC	9.3	9.6	9.6	9.5	9.3	9.3	9.4	9.5	9.9	9.7	9.4
<b>Total OPEC</b>	<b>29.5</b>	<b>27.2</b>	<b>28.9</b>	<b>30.6</b>	<b>31.3</b>	<b>32.0</b>	<b>32.7</b>	<b>33.9</b>	<b>36.7</b>	<b>39.9</b>	<b>44.6</b>
<b>Total World</b>	<b>70.5</b>	<b>67.8</b>	<b>68.2</b>	<b>69.5</b>	<b>70.8</b>	<b>71.8</b>	<b>72.7</b>	<b>74.2</b>	<b>77.4</b>	<b>79.7</b>	<b>84.9</b>
Percent OPEC	41.8	40.1	42.4	44.0	44.2	44.6	45.0	45.7	47.4	50.1	52.5

Source: Cambridge Energy Research Associates.

Updated February 1995

## U.S. Crude and Condensate Productive Capacity



Source: Cambridge Energy Research Associates.

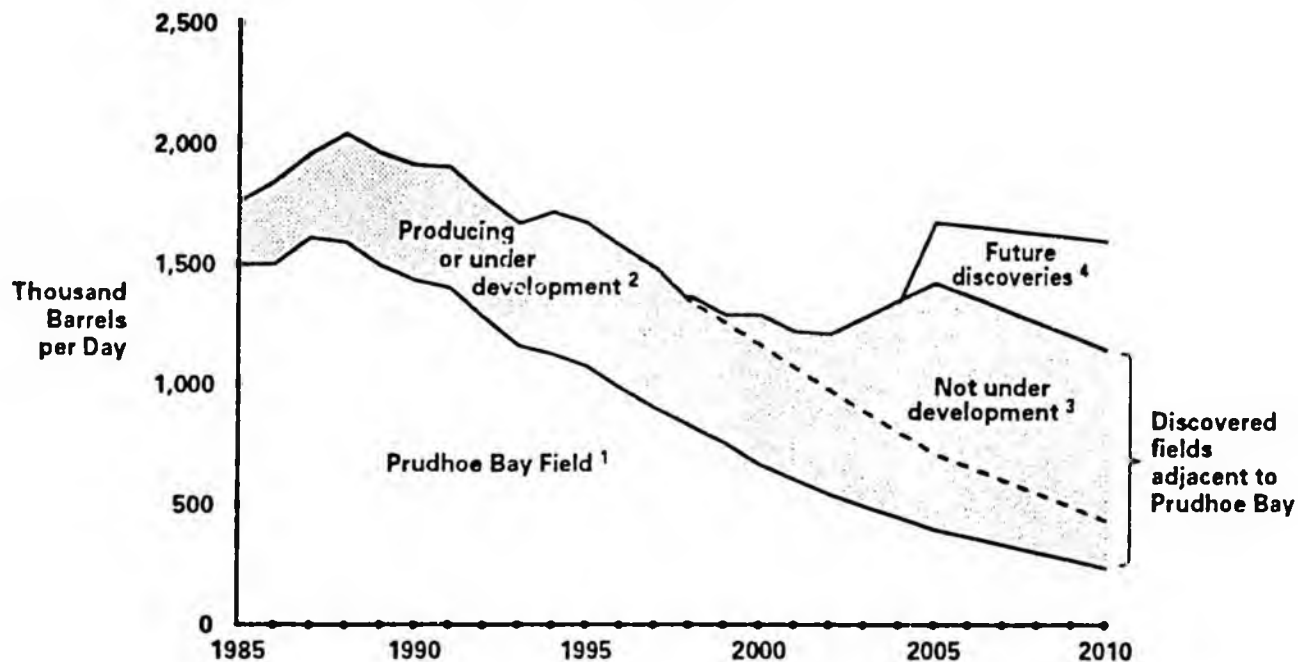
Updated March 1995.

**U.S. Productive Capacity  
Crude and Condensate  
(million barrels per day)**

	Productibility											
	Actual				Forecast							
	1988	1990	1991	1992	1993	1994	1995	1997	2000	2005	2010	
<u>District I</u>	0.02	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.04
<u>District II</u>												
Upper	0.20	0.18	0.16	0.15	0.14	0.13	0.12	0.11	0.10	0.08	0.05	
Lower	<u>0.51</u>	<u>0.45</u>	<u>0.44</u>	<u>0.42</u>	<u>0.40</u>	<u>0.37</u>	<u>0.35</u>	<u>0.31</u>	<u>0.25</u>	<u>0.20</u>	<u>0.15</u>	
<b>Total</b>	<b>0.71</b>	<b>0.63</b>	<b>0.60</b>	<b>0.57</b>	<b>0.54</b>	<b>0.50</b>	<b>0.47</b>	<b>0.42</b>	<b>0.35</b>	<b>0.28</b>	<b>0.20</b>	
<u>District III</u>												
Southeast	0.19	0.17	0.16	0.15	0.15	0.14	0.14	0.13	0.11	0.08	0.06	
Louisiana	1.19	1.04	1.12	1.14	1.13	1.15	1.17	1.16	1.40	1.30	1.00	
Texas	2.07	1.88	1.94	1.85	1.79	1.68	1.60	1.45	1.25	1.00	0.82	
New Mexico	<u>0.19</u>	<u>0.18</u>	<u>0.18</u>	<u>0.19</u>	<u>0.19</u>	<u>0.18</u>	<u>0.18</u>	<u>0.17</u>	<u>0.15</u>	<u>0.13</u>	<u>0.10</u>	
<b>Total</b>	<b>3.64</b>	<b>3.27</b>	<b>3.40</b>	<b>3.33</b>	<b>3.26</b>	<b>3.15</b>	<b>3.09</b>	<b>2.91</b>	<b>2.91</b>	<b>2.51</b>	<b>1.98</b>	
<u>District IV</u>	0.67	0.60	0.58	0.55	0.51	0.47	0.43	0.40	0.35	0.30	0.25	
<u>District I - IV (EOR)</u>	5.04	4.51	4.59	4.46	4.34	4.13	4.00	3.74	3.62	3.10	2.47	
<u>District V</u>												
Alaska	2.09	1.95	1.94	1.82	1.70	1.76	1.71	1.53	1.35	1.73	1.64	
California et al	<u>1.06</u>	<u>0.97</u>	<u>0.98</u>	<u>0.98</u>	<u>0.95</u>	<u>0.93</u>	<u>0.95</u>	<u>0.94</u>	<u>0.92</u>	<u>1.03</u>	<u>0.95</u>	
<b>Total</b>	<b>3.15</b>	<b>2.92</b>	<b>2.92</b>	<b>2.80</b>	<b>2.65</b>	<b>2.69</b>	<b>2.66</b>	<b>2.47</b>	<b>2.27</b>	<b>2.76</b>	<b>2.59</b>	
<b>Total U.S.</b>	<b>8.19</b>	<b>7.43</b>	<b>7.51</b>	<b>7.27</b>	<b>6.99</b>	<b>6.82</b>	<b>6.66</b>	<b>6.21</b>	<b>5.89</b>	<b>5.86</b>	<b>5.06</b>	

Source: Cambridge Energy Research Associates.  
Updated March 1995.

## North-Slope Alaska Liquid Productive Capacity



Source: Cambridge Energy Research Associates.

1. Includes Prudhoe Bay, Eileen West End, GHX 1 and 2, Hurl State, NGLs.
2. Includes Kuparuk, Lisburne, N. Sag Delta, Milne Point (NW and Cascade), Endicott, Pt. McIntyre, Niakuk, West Beach.
3. Includes W. Sak, North Star Complex, Gwydyr Bay, Pt. Thomson, Hammerhead, Tern Island, Badami, Kuvlum, Colville Delta Area.
4. Excludes any production from ANWR.

Updated March 1995.

## **The Longer Term: Beyond 1996**

**NEW OIL MARKET REALITIES**  
**Factors to Watch to 2000**



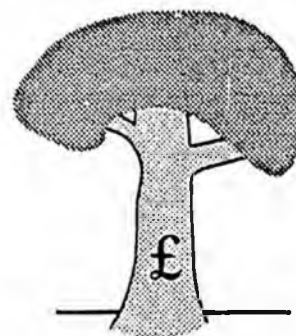
**The F.S.U.**



**Economic recovery and oil demand  
 - and expectations**



**Iraqi re-entry**  
**Not if, but when and how.**  
**With or without Saddam?**



**New taxation, both environment  
 and revenue-driven**  
**New conservation initiatives**

**OPEC**

**Saudi Arabia**  
**OPEC accommodating Saudi Arabia**  
**Saudi Arabia accommodating Iran and OPEC**

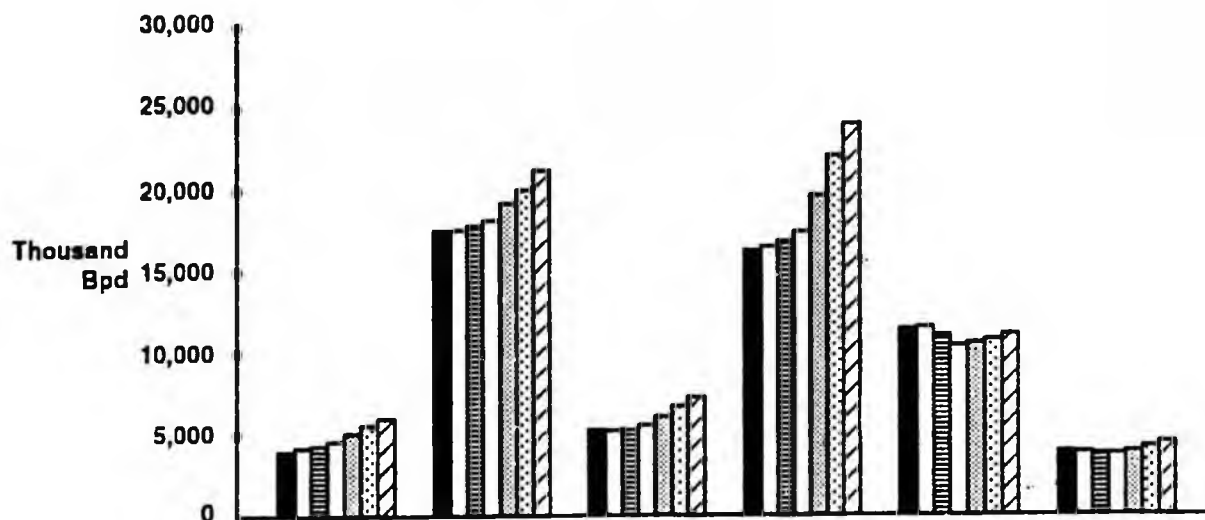


**Technology**

- Lowering production costs
- Improving efficiency
- Impacting demand

Source: Cambridge Energy Research Associates.

## World Oil Demand

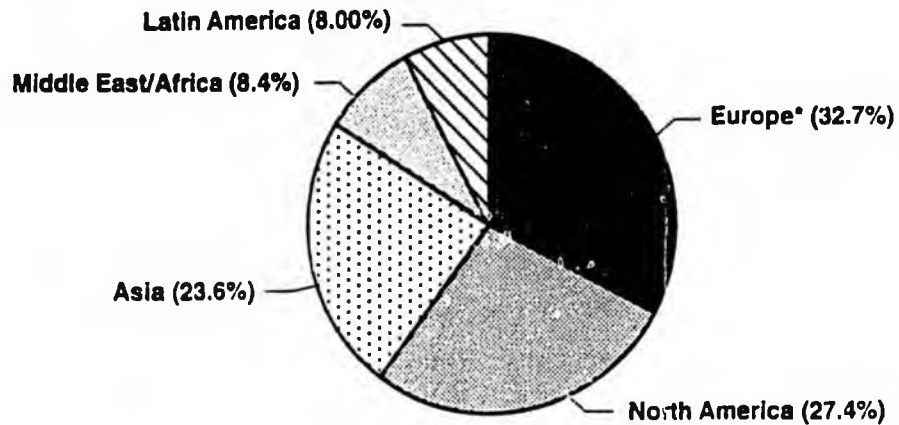


		Naphtha	Gasoline	Jet/Kero	Diesel	Residual	Other	Total
90	■	2,683	17,549	5,252	16,232	11,438	3,909	61,018
91	□	2,782	17,602	5,196	16,495	11,557	3,875	61,688
92	▨	2,866	17,837	5,244	16,817	11,088	3,750	61,936
95	□	3,050	18,169	5,520	17,450	10,403	3,734	62,910
2000	▤	3,509	19,167	6,087	19,642	10,579	3,927	68,011
2005	▥	3,853	20,029	6,698	22,065	10,787	4,210	73,199
2010	▧	4,028	21,208	7,240	24,023	11,097	4,473	78,036
Average % P.A. Growth Rate 1991-2005		1.9%	1.0%	1.8%	2.0%	0.7%	1.0%	1.3%

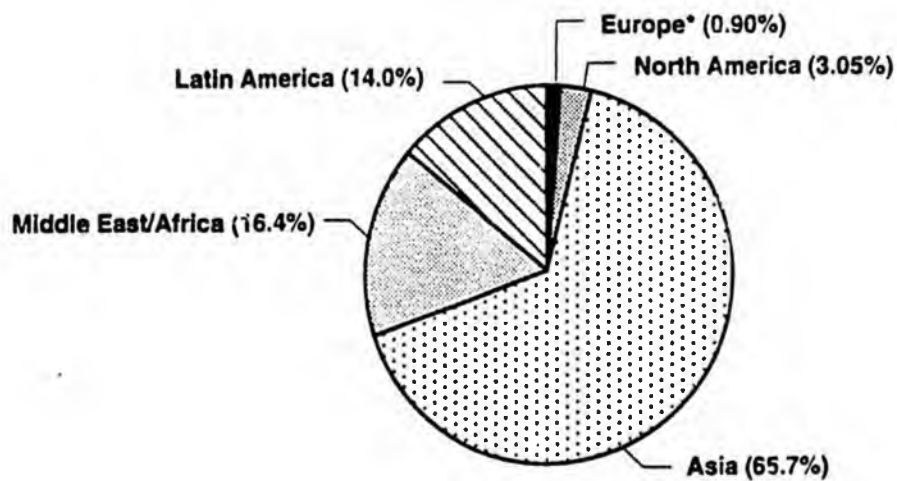
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2.28.95

Source: Cambridge Energy Research Associates.

### Future Oil Demand Growth: Concentrated in Developing Countries



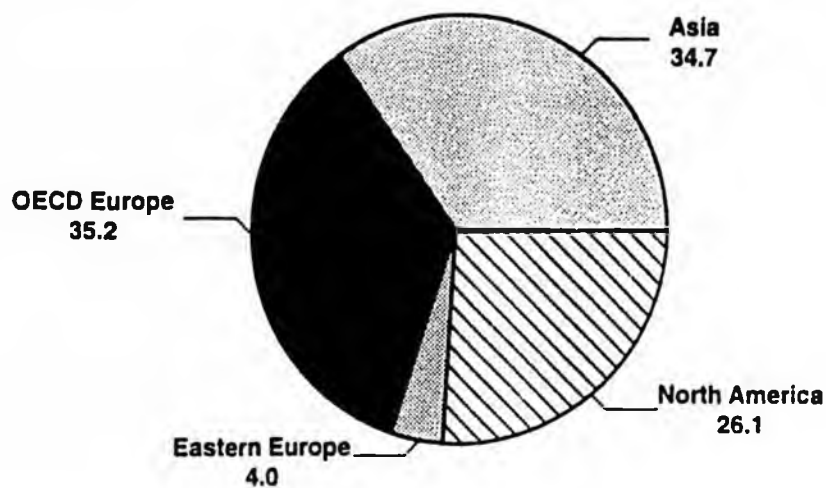
Share of Total Demand: 1992



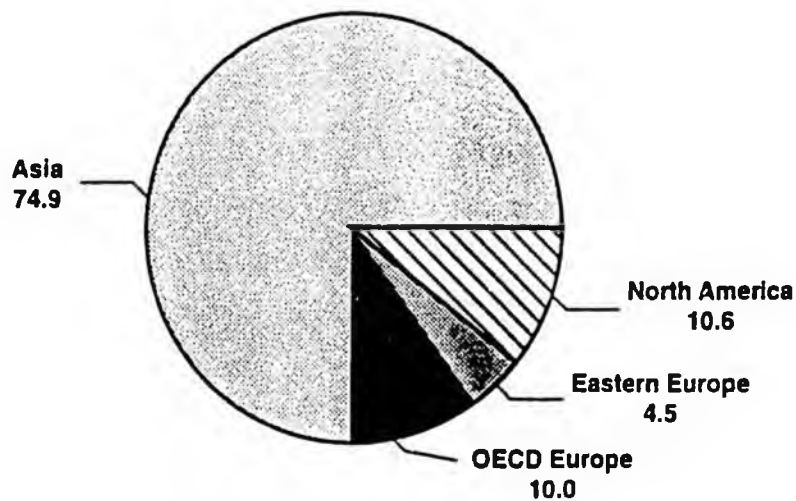
Share of Demand Growth: 1993 through 2005

\* Includes Eastern Europe and FSU

## Future Oil Import Growth: Concentrated in Asia

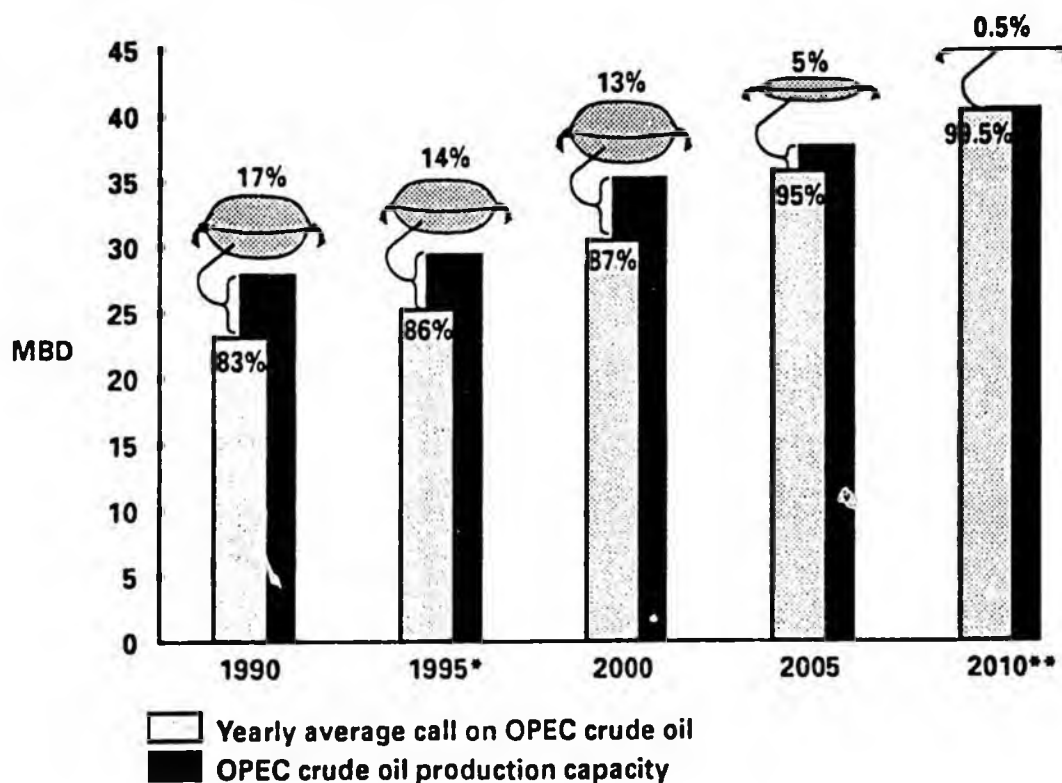


Total Imports: 1992  
(Percent)



Import Growth: 1993 through 2010  
(Percent)

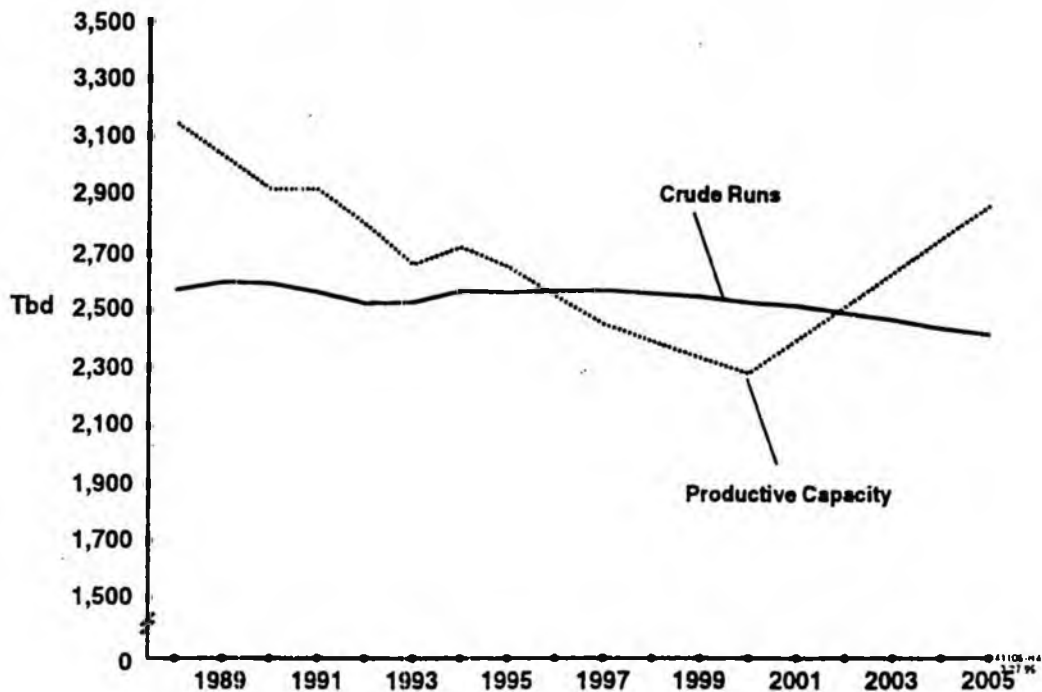
## NEW OIL MARKET REALITIES The OPEC Cushion



\* Excluding Iraq (included in 2000 and beyond).

\*\* Capacity based on currently announced plans. Demand = 86.5 mbd.

### PADD V Crude Productive Capacity and Demand



Source: Cambridge Energy Research Associates.



## CERA's Long-Term Oil Price Scenarios

The conventional wisdom has been that oil prices will rise over time. This thinking is based on a view of price as it was in the 1970s and early 1980s—precariously balanced and subject to spiking. It is important to challenge this wisdom by considering the longer history of price and to reconsider the history of the last two decades, and in particular to reconsider the time when an oversupplied market led to a low oil price environment.

In the following two pages of charts and tables, CERA presents very briefly the result of its consideration of future price movements. It represents our view of three different scenarios for the future. Various signposts serve to demarcate which scenario is unfolding. The three global scenarios are based on distinctly different views of the future:

- **Global Dawn.** This presupposes the evolution of a relatively cooperative world where the greatest wealth goes to the greatest number of people. Oil prices do not increase sharply as production capacity utilization rises with demand. Largely environmentally driven policies help keep oil demand in check. Oil prices are flat on a real basis and rise gradually starting late in the decade when utilization begins to tighten.
- **Gilded Cage.** In this scenario, for the next two to four years, economic growth is strong. But unlike the Global Dawn scenario, many outstanding economic and political problems are not dealt with effectively. Oil demand grows rapidly and surplus world production capacity is used up rapidly leading to higher oil prices which peak by 1999. Ultimately high prices and inflationary pressures lead to weaker economic growth and a downward adjustment in oil prices.
- **Pax Faustian.** This scenario is characterized by weak economic growth brought on by the inability of world powers to deal with fundamental economic and social problems. Oil prices decline to \$10 a barrel by 1998 and slowly recover into the next decade. The price increases are mainly due to deferred capacity investments which eventually tighten the utilization rate despite a significant decline in oil demand this decade.

CERA's interpretation of current signposts points toward the Global Dawn scenario, leading to flat real prices for the next several years. However, it is important to watch for various signposts that indicate a change toward the other two scenarios. These signposts are clearly outlined in the following summary in order to provide guidance on the impact of future events and trends.

**On-site presentations and in-depth, long-term scenarios for each service area plus CERA's global economic and political scenarios are available. Please contact Steve Haggatt at (617) 497-6446 for more information, or fax (617) 497-0423.**

## CERA Scenarios to 2005



GLOBAL DAWN



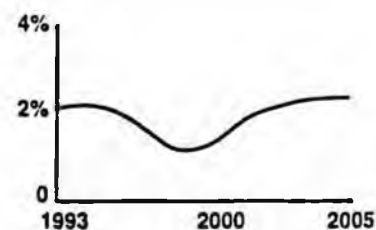
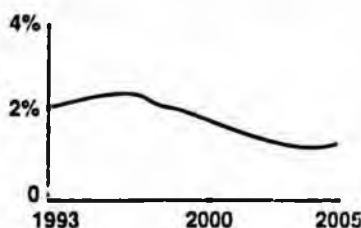
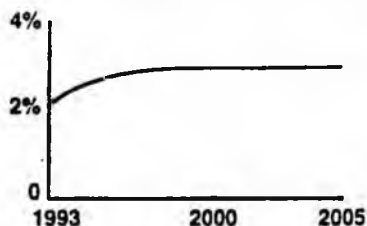
GILDED CAGE



PAX FAUSTIAN

Political Trends	GLOBAL DAWN	GILDED CAGE	PAX FAUSTIAN
	Global interdependence, cooperation	Regional and national rivalries increase	Protectionist, nationalist policy in industrialized countries
	Cooperative stable Middle East	Tension in Middle East and LDCs	Widespread unrest in LDCs, especially China and Far East and Middle East
	Integration of FSU into world order	A fragmented Far East	OPEC's Triangle of Contention is not resolved
	Problems resolved in China, Asia sees prosperity and growth	Political Islam continues to rise	Little integration of FSU
	OPEC's Triangle of Contention is resolved in the late 1990s	Slower and less complete integration of FSU	Rearmament
	Oil producers increase revenue through higher volume	Oil producers increase revenue through higher price	

## World Economic Growth



## Policy/Demographics

Policy/Demographics	GLOBAL DAWN	GILDED CAGE	PAX FAUSTIAN
	Strong environmental consciousness and policy	Environment is only a fashion	Status quo
	Long-term energy policy implementation	Limited political will and little structural change	No major policy initiatives
	Lifestyle shift to community responsibility	Emphasis on individual and national liberty	Little new environmental action
	Strong gains in world median personal income	Uneven distribution of wealth	Slow growth to falling median personal income

## Energy Trends

Energy Trends	GLOBAL DAWN	GILDED CAGE	PAX FAUSTIAN
	Policy driven fuel choice	Price driven fuel choice	Price/economics driven
	Gas gains ground; clean coal	Oil use persists, some shift to gas, coal remains	Surplus capacity develops at all levels
	Accelerating efficiency	Efficiency gains plateau	OPEC does not resolve capacity utilization issues, keeping output high
	Managed capacity utilization	High capacity utilization initially, declines later in time period	Persistent oil use, little gas gain, no new nuclear, emphasis on coal
	Technology reduces production costs	Privatization trend slows	
	"Statlam" replaced by private enterprise		

## Oil Demand

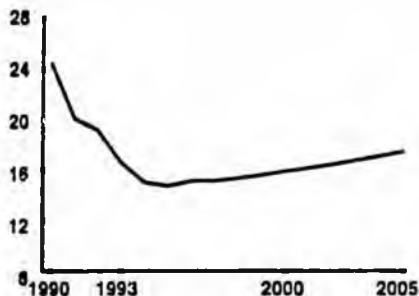
Oil Demand	GLOBAL DAWN	GILDED CAGE	PAX FAUSTIAN
	Eco-taxes on energy	Overall, oil use increases in industrial countries and in LDCs	Oil demand declines as much as 4.0 mbd
	Oil demand growth rate slow in industrial world, LDC demand increases sharply	Oil demand falls late in period in OECD due to price and income effects of high oil prices	Fewer efficiency gains in transportation sector
			Industrial demand level with economic growth

## Summary Oil Price Movements for the Scenarios



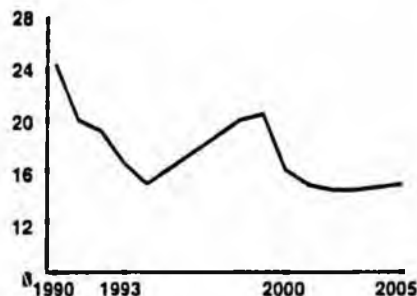
**GLOBAL DAWN**

The OPEC Basket price is relatively flat in real terms until 1997. It rises gradually on a real basis toward \$17.50/Bbl by 2005.



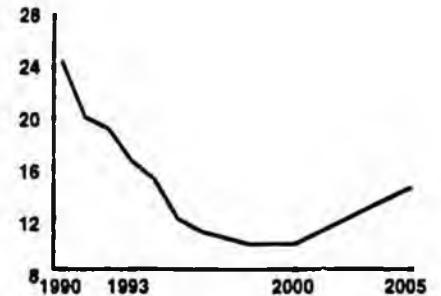
**GILDED CAGE**

The OPEC Basket increases to a real price of \$20.50/Bbl by 1999. Thereafter, real prices fall to \$14.50/Bbl by 2003 and gradually recover to \$15/Bbl by 2005.



**PAX FAUSTIAN**

The OPEC Basket decreases to \$10/Bbl by 1998, and then starts to recover in 2001, rising to \$14.50/Bbl by 2005.



CERA's interpretation of the current signposts points towards the Global Dawn scenario, leading to relatively flat real prices through 1997. Prices rise gradually on a real basis starting late in the decade. This scenario is based on the view that production capacity utilization rises with demand until late in the decade.

However, it is important to watch for various signposts that indicate a change toward the two other scenarios, both of which should be weighed when considering future decisions. The following signposts signal a change in demand or supply that will indicate a shift from Global Dawn.

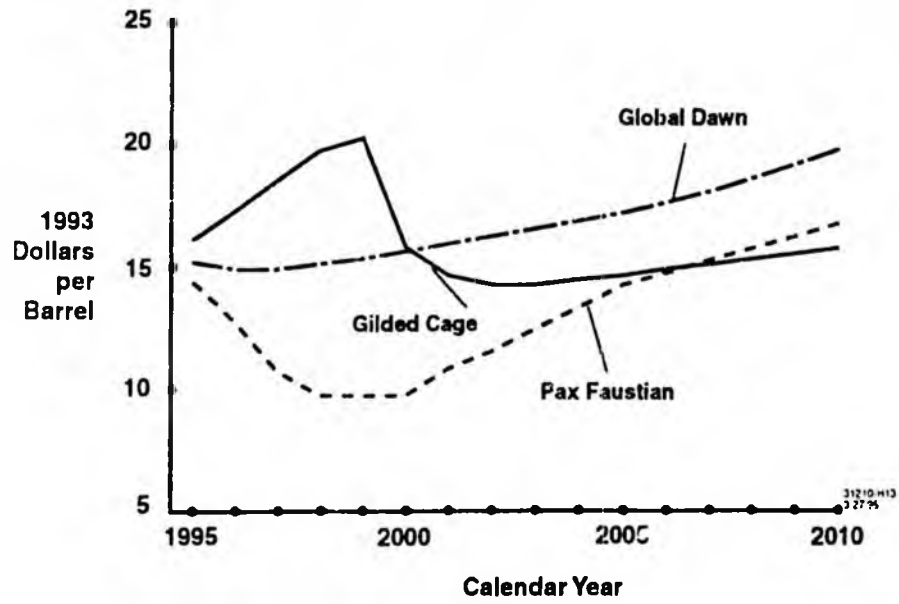
### SIGNPOSTS TO HIGHER PRICES/ GILDED CAGE

- ☐ Prolonged instability in the FSU
- ☐ Political Islam makes strong gains
- ☐ An environmental event that spurs action to use oil as a temporary substitute for coal or nuclear power.
- ☐ Global underinvestment in capacity, less privatization
- ☐ Asian economic growth beyond expectations
- ☐ Modest conservation measures help lead to strong OECD demand.

### SIGNPOSTS TO LOWER PRICES/ PAX FAUSTIAN

- ☐ Weak economic growth
- ☐ Energy taxes and conservation measures increase. Development of such policies in LDCs
- ☐ Lower demand and capacity utilization leads to revenue pressures and competition for market share among producers.
- ☐ Acceleration in FSU oil supply
- ☐ Opening of exploration and production in OPEC and other areas adds to world capacity.

### Long-Term Outlook-ANS



Updated March 1995.

Source: Cambridge Energy Research Associates.