

# Appendices

# **Appendix A**

---

**Request Letter  
and**

**Description of the  
National Petroleum Council**



The Secretary of Energy  
Washington, DC 20585

March 13, 2002

Mr. William A. Wise  
Chairman  
National Petroleum Council  
1625 K Street, NW  
Washington, DC 20006

Dear Chairman Wise:

In the last decade, the National Petroleum Council conducted two landmark studies on natural gas, the 1992 study *Potential of Natural Gas in the United States* and the 1999 study *Meeting the Challenges of the Nation's Growing Natural Gas Demand*. These studies provided valuable insights on the potential contribution of natural gas to the Nation's economic, energy and environmental future, and the capabilities of industry to meet future natural gas demand and changing market conditions.

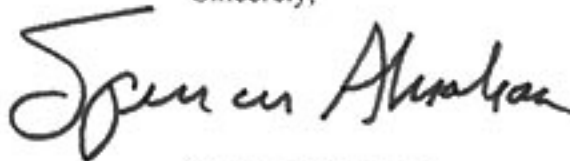
Considerable change has occurred in natural gas markets since the Council's 1999 study, among these being new concerns over national security, a changed near-term outlook for the economy, and turbulence in energy markets based on perceived risk, price volatility, fuel switching capabilities, and the availability of other fuels. The Nation's reliance on natural gas continues to grow, with U.S. consumption projected to increase by 50 percent in the next 20 years. However, the availability of investment capital and infrastructure, the pace of technology progress, access to the Nation's resource base, and new sources of supplies from Alaska, Canada, liquefied natural gas imports, and unconventional resources such as methane hydrates are factors that could affect the future availability of natural gas supplies.

Accordingly, I request that the Council conduct a new study on natural gas in the United States in the 21<sup>st</sup> Century. Such a study should examine the potential implications of new supplies, new technologies, new perceptions of risk, and other evolving market conditions that may affect the potential for natural gas demand, supplies, and delivery through 2025. It should also provide insights on energy market dynamics, including price volatility and future fuel choice, and an outlook on the longer-term sustainability of natural gas supplies. Of particular interest is the Council's advice on actions that can be taken by industry and Government to increase the productivity and efficiency of North American natural gas markets and to ensure adequate and reliable supplies of energy for consumers.



I am designating Mr. Robert G. Card, Under Secretary for Energy, Environment and Science, and Mr. Carl Michael Smith, Assistant Secretary for Fossil Energy, to represent me in the conduct of this important study. I offer my gratitude to the Council for its efforts to assist the Department in defining the scope of the study request and I recognize that refinements may be necessary after the study starts to ensure that the most critical issues affecting future natural gas demand, supplies, and delivery are addressed.

Sincerely,

A handwritten signature in cursive script, appearing to read "Spencer Abraham". The signature is written in black ink and is positioned below the word "Sincerely,".

Secretary Abraham

## NATIONAL PETROLEUM COUNCIL BACKGROUND INFORMATION ON THE NATIONAL PETROLEUM COUNCIL

In May 1946, the President stated in a letter to the Secretary of the Interior that he had been impressed by the contribution made through government/industry cooperation to the success of the World War II petroleum program. He felt that it would be beneficial if this close relationship were to be continued and suggested that the Secretary of the Interior establish an industry organization to advise the Secretary on oil and natural gas matters.

Pursuant to this request, Interior Secretary J. A. Krug established the National Petroleum Council (NPC) on June 18, 1946. In October 1977, the Department of Energy was established and the Council was transferred to the new department.

The purpose of the NPC is solely to advise, inform, and make recommendations to the Secretary of Energy on any matter requested by the Secretary, relating to oil and natural gas or the oil and gas industries. Matters that the Secretary would like to have considered by the Council are submitted in the form of a letter outlining the nature and scope of the study. The Council reserves the right to decide whether it will consider any matter referred to it.

Examples of studies undertaken by the NPC at the request of the Secretary include:

- *U.S. Arctic Oil & Gas* (1981)
- *Environmental Conservation – The Oil & Gas Industries* (1982)
- *Third World Petroleum Development: A Statement of Principles* (1982)
- *Petroleum Inventories and Storage Capacity* (1983, 1984)
- *Enhanced Oil Recovery* (1984)
- *The Strategic Petroleum Reserve* (1984)
- *U.S. Petroleum Refining* (1986)
- *Factors Affecting U.S. Oil & Gas Outlook* (1987)
- *Integrating R&D Efforts* (1988)
- *Petroleum Storage & Transportation* (1989)
- *Industry Assistance to Government – Methods for Providing Petroleum Industry Expertise During Emergencies* (1991)
- *Short-Term Petroleum Outlook – An Examination of Issues and Projections* (1991)
- *Petroleum Refining in the 1990s – Meeting the Challenges of the Clean Air Act* (1991)
- *The Potential for Natural Gas in the United States* (1992)
- *U.S. Petroleum Refining – Meeting Requirements for Cleaner Fuels and Refineries* (1993)
- *The Oil Pollution Act of 1990: Issues and Solutions* (1994)
- *Marginal Wells* (1994)
- *Research, Development, and Demonstration Needs of the Oil and Gas Industry* (1995)
- *Future Issues – A View of U.S. Oil & Natural Gas to 2020* (1995)
- *Issues for Interagency Consideration – A Supplement to the NPC's Report: Future Issues – A View of U.S. Oil & Natural Gas to 2020* (1996)
- *U.S. Petroleum Product Supply – Inventory Dynamics* (1998)
- *Meeting the Challenges of the Nation's Growing Natural Gas Demand* (1999)
- *U.S. Petroleum Refining – Assuring the Adequacy and Affordability of Cleaner Fuels* (2000)
- *Securing Oil and Natural Gas Infrastructures in the New Economy* (2001).

The NPC does not concern itself with trade practices, nor does it engage in any of the usual trade association activities. The Council is subject to the provisions of the Federal Advisory Committee Act of 1972.

Members of the National Petroleum Council are appointed by the Secretary of Energy and represent all segments of the oil and gas industries and related interests. The NPC is headed by a Chair and a Vice Chair, who are elected by the Council. The Council is supported entirely by voluntary contributions from its members.

# NATIONAL PETROLEUM COUNCIL

## MEMBERSHIP

---

2002/2003

Jacob Adams  
President  
Arctic Slope Regional Corporation

George A. Alcorn, Sr.  
President  
Alcorn Exploration, Inc.

Conrad K. Allen  
President  
National Association of Black Geologists  
and Geophysicists

Robert J. Allison, Jr.  
Chairman, President and  
Chief Executive Officer  
Anadarko Petroleum Corporation

Robert O. Anderson  
Roswell, New Mexico

Philip F. Anschutz  
President  
The Anschutz Corporation

Gregory L. Armstrong  
Chairman and  
Chief Executive Officer  
Plains All American

Robert G. Armstrong  
President  
Armstrong Energy Corporation

Gregory A. Arnold  
President and  
Chief Operating Officer  
Truman Arnold Companies

Ralph E. Bailey  
Chairman and  
Chief Executive Officer  
American Bailey Inc.

Robert W. Best  
Chairman of the Board, President  
and Chief Executive Officer  
Atmos Energy Corporation

M. Frank Bishop  
Executive Director  
National Association of  
State Energy Officials

Alan L. Boeckmann  
Chairman and  
Chief Executive Officer  
Fluor Corporation

Carl E. Bolch, Jr.  
Chairman and  
Chief Executive Officer  
Racetrac Petroleum, Inc.

Donald T. Bollinger  
Chairman of the Board and  
Chief Executive Officer  
Bollinger Shipyards, Inc.

John F. Bookout  
Houston, Texas

Wayne H. Brunetti  
Chairman, President and  
Chief Executive Officer  
Xcel Energy Inc.

Philip J. Burguières  
Chief Executive Officer  
EMC Holdings, L.L.C.

Victor A. Burk  
Managing Partner  
Oil & Gas Division  
Deloitte & Touche LLP

Frank M. Burke, Jr.  
Chairman and  
Chief Executive Officer  
Burke, Mayborn Company, Ltd.

## NATIONAL PETROLEUM COUNCIL

Karl R. Butler  
President and  
Chief Executive Officer  
ICC Energy Corporation

Thos. E. Capps  
Chairman, President and  
Chief Executive Officer  
Dominion

Robert B. Catell  
Chairman and  
Chief Executive Officer  
KeySpan

Clarence P. Cazalot, Jr.  
President  
Marathon Oil Company

Luke R. Corbett  
Chairman and  
Chief Executive Officer  
Kerr-McGee Corporation

Michael B. Coulson  
President  
Coulson Oil Group

Gregory L. Craig  
President  
Cook Inlet Energy Supply

William A. Custard  
President and  
Chief Executive Officer  
Dallas Production, Inc.

Robert Darbelnet  
President and  
Chief Executive Officer  
AAA

Charles D. Davidson  
Chairman, President and  
Chief Executive Officer  
Noble Energy, Inc.

Claiborne P. Deming  
President and  
Chief Executive Officer  
Murphy Oil Corporation

Cortlandt S. Dietler  
President and  
Chief Executive Officer  
TransMontaigne Oil Company

Dan O. Dinges  
Chairman, President and  
Chief Executive Officer  
Cabot Oil & Gas Corporation

David F. Dorn  
Chairman Emeritus  
Forest Oil Corporation

E. Linn Draper, Jr.  
Chairman, President and  
Chief Executive Officer  
American Electric Power Co., Inc.

John G. Drosdick  
Chairman, President and  
Chief Executive Officer  
Sunoco, Inc.

Archie W. Dunham  
Chairman of the Board  
ConocoPhillips

W. Byron Dunn  
President and  
Chief Executive Officer  
Lone Star Steel Company

Daniel C. Eckermann  
President and  
Chief Executive Officer  
LeTourneau, Inc.

James C. Ellington  
Chairman  
The Energy Council

James W. Emison  
Chairman and  
Chief Executive Officer  
Western Petroleum Company

Ronald A. Erickson  
Chief Executive Officer  
Holiday Companies

Sheldon R. Erikson  
Chairman of the Board, President  
and Chief Executive Officer  
Cooper Cameron Corporation

## NATIONAL PETROLEUM COUNCIL

Stephen E. Ewing  
President and  
Chief Operating Officer  
DTE Energy Gas

John G. Farbes  
President  
Big Lake Corporation

Claire Scobee Farley  
Chief Executive Officer  
Randall & Dewey, Inc.

G. Steven Farris  
President and  
Chief Executive Officer  
Apache Corporation

William L. Fisher  
Barrow Chair in Mineral Resources  
Department of Geological Sciences and  
Director of the Jackson School of Geoscience  
University of Texas at Austin

James C. Flores  
Chairman and  
Chief Executive Officer  
Plains Exploration &  
Production Company

Eric O. Fornell  
Managing Director and  
Group Executive  
Global Natural Resources Group  
J. P. Morgan Securities Inc.

Joe B. Foster  
Non-executive Chairman  
Newfield Exploration Company

Robert W. Fri  
Visiting Scholar  
Resources For the Future Inc.

Murry S. Gerber  
President and  
Chief Executive Officer  
Equitable Resources

James A. Gibbs  
Chairman  
Five States Energy Company

Rufus D. Gladney  
Chairman  
American Association of Blacks in Energy

Lawrence J. Goldstein  
President  
Petroleum Industry Research  
Foundation, Inc.

Charles W. Goodyear  
Chief Executive Officer  
BHP Billiton Plc

Bruce C. Gottwald  
Chairman of the Board  
Ethyl Corporation

Andrew Gould  
Chairman and  
Chief Executive Officer  
Schlumberger Limited

S. Diane Graham  
Chairman and  
Chief Executive Officer  
STRATCO, Inc.

William E. Greehey  
Chairman of the Board and  
Chief Executive Officer  
Valero Energy Corporation

Robbie Rice Gries  
President  
American Association of  
Petroleum Geologists

James T. Hackett  
President and  
Chief Operating Officer  
Devon Energy Corporation

Frederic C. Hamilton  
Chairman  
The Hamilton Companies

Christine Hansen  
Executive Director  
Interstate Oil and Gas  
Compact Commission

Angela E. Harrison  
Chairman and  
Chief Executive Officer  
WELSCO, Inc.



## NATIONAL PETROLEUM COUNCIL

Lewis Hay, III  
Chairman, President and  
Chief Executive Officer  
FPL Group

Frank O. Heintz  
President and  
Chief Executive Officer  
Baltimore Gas and Electric Company

John B. Hess  
Chairman, President and  
Chief Executive Officer  
Amerada Hess Corporation

Jack D. Hightower  
President and  
Chief Executive Officer  
Celero Energy LLC

Jerry V. Hoffman  
Chairman, President and  
Chief Executive Officer  
Berry Petroleum Company

Roy M. Huffington  
Chairman of the Board and  
Chief Executive Officer  
Roy M. Huffington, Inc.

Dudley J. Hughes  
President  
Hughes South Corporation

Ray L. Hunt  
Chairman of the Board  
Hunt Oil Company

Hillard Huntington  
Executive Director  
Energy Modeling Forum  
Stanford University

Frank J. Iarossi  
Chairman  
American Bureau of Shipping &  
Affiliated Companies

Ray R. Irani  
Chairman and  
Chief Executive Officer  
Occidental Petroleum Corporation

Eugene M. Isenberg  
Chairman and  
Chief Executive Officer  
Nabors Industries, Inc.

Francis D. John  
Chairman, President and  
Chief Executive Officer  
Key Energy Services, Inc.

A. V. Jones, Jr.  
Chairman  
Van Operating, Ltd.

Jon Rex Jones  
Chairman  
EnerVest Management Company, L. C.

Jerry D. Jordan  
President  
Jordan Energy Inc.

Fred C. Julander  
President  
Julander Energy Company

John A. Kaneb  
Chief Executive Officer  
Gulf Oil Limited Partnership

W. Robert Keating  
Commissioner  
Department of Telecommunications  
and Energy  
Commonwealth of Massachusetts

Bernard J. Kennedy  
Chairman Emeritus  
National Fuel Gas Company

James W. Keyes  
President and  
Chief Executive Officer  
7-Eleven, Inc.

Richard D. Kinder  
Chairman and  
Chief Executive Officer  
Kinder Morgan Energy Partners, L.P.

Susan M. Landon  
Petroleum Geologist

## NATIONAL PETROLEUM COUNCIL

Stephen D. Layton  
President  
E&B Natural Resources

Virginia B. Lazenby  
Chairman and  
Chief Executive Officer  
Bretagne G.P.

Kathy Prasnicky Lehne  
Founder, President and  
Chief Executive Officer  
Sun Coast Resources, Inc.

David J. Lesar  
Chairman of the Board, President  
and Chief Executive Officer  
Halliburton Company

James D. Lightner  
Chairman, President and  
Chief Executive Officer  
Tom Brown, Inc.

Michael C. Linn  
President  
Linn Energy, LLC

Daniel H. Lopez  
President  
New Mexico Institute of  
Mining and Technology

Thomas E. Love  
Chairman and  
Chief Executive Officer  
Love's Country Stores, Inc.

William D. McCabe  
Vice President  
Energy Resources  
ThermoEnergy Corporation

Aubrey K. McClendon  
Chairman of the Board and  
Chief Executive Officer  
Chesapeake Energy Corporation

W. Gary McGilvray  
President and  
Chief Executive Officer  
DeGolyer and MacNaughton

Cary M. Maguire  
President  
Maguire Oil Company

Steven J. Malcolm  
President and  
Chief Executive Officer  
The Williams Companies, Inc.

Timothy M. Marquez  
Chief Executive Officer  
Marqon Energy L.L.C.

Frederick R. Mayer  
Chairman  
Captiva Resources, Inc.

F. H. Merelli  
Chairman, President and  
Chief Executive Officer  
Cimarex Energy Co.

C. John Miller  
Chief Executive Officer  
Miller Energy, Inc.

Merrill A. Miller, Jr.  
Chairman, President and  
Chief Executive Officer  
National Oilwell, Inc.

Herman Morris, Jr.  
President and  
Chief Executive Officer  
Memphis Light, Gas & Water Division

Robert A. Mosbacher  
Chairman  
Mosbacher Energy Company

James J. Mulva  
President and  
Chief Executive Officer  
ConocoPhillips

John Thomas Munro  
President  
Munro Petroleum &  
Terminal Corporation

David L. Murfin  
President  
Murfin Drilling Co., Inc.

## NATIONAL PETROLEUM COUNCIL

Mark B. Murphy  
President  
Strata Production Company

William C. Myler, Jr.  
President  
The Muskegon Development Company

Gary L. Neale  
Chairman, President and  
Chief Executive Officer  
NiSource Inc.

J. Larry Nichols  
Chairman of the Board and  
Chief Executive Officer  
Devon Energy Corporation

John W. B. Northington  
Vice President  
National Environmental Strategies Inc.

Erle Nye  
Chairman of the Board and  
Chief Executive  
TXU Corp.

Christine J. Olson  
Chairman and  
Chief Executive Officer  
S. W. Jack Drilling Company

David J. O'Reilly  
Chairman of the Board and  
Chief Executive Officer  
ChevronTexaco Corporation

C. R. Palmer  
Chairman of the Board  
Rowan Companies, Inc.

Mark G. Papa  
Chairman and  
Chief Executive Officer  
EOG Resources, Inc.

Paul H. Parker  
Vice President  
Center for Resource Management

Robert L. Parker, Sr.  
Chairman of the Board  
Parker Drilling Company

A. Glenn Patterson  
President and  
Chief Operating Officer  
Patterson-UTI Energy Inc.

Ross J. Pillari  
President  
BP America Inc.

L. Frank Pitts  
Owner  
Pitts Energy Group

Richard B. Priory  
Chairman, President and  
Chief Executive Officer  
Duke Energy Corporation

Caroline Quinn  
Mount Vernon, Illinois

Keith O. Rattie  
President and  
Chief Executive Officer  
Questar Corporation

Lee R. Raymond  
Chairman and  
Chief Executive Officer  
Exxon Mobil Corporation

John G. Rice  
President and  
Chief Executive Officer  
GE Power Systems

Corbin J. Robertson, Jr.  
President  
Quintana Minerals Corporation

Robert E. Rose  
Chairman of the Board  
GlobalSantaFe Corporation

Henry A. Rosenberg, Jr.  
Chairman of the Board  
Crown Central Petroleum Corporation

Robert J. Routs  
Former President  
and Country Chairman  
Shell Oil Company

## NATIONAL PETROLEUM COUNCIL

Mark A. Rubin  
Executive Director  
Society of Petroleum Engineers

Robert Santistevan  
Director  
Southern Ute Indian Tribe  
Growth Fund

S. Scott Sewell  
President  
Delta Energy Management, Inc.

Bobby S. Shackouls  
Chairman, President and  
Chief Executive Officer  
Burlington Resources Inc.

Scott D. Sheffield  
Chairman, President and  
Chief Executive Officer  
Pioneer Natural Resources Company

Matthew R. Simmons  
Chairman and  
Chief Executive Officer  
Simmons and Company International

Sam R. Simon  
President and  
Chief Executive Officer  
Atlas Oil Company

Bob R. Simpson  
Chairman and  
Chief Executive Officer  
XTO Energy Inc.

Bruce A. Smith  
Chairman, President and  
Chief Executive Officer  
Tesoro Petroleum Corporation

Charles C. Stephenson, Jr.  
Chairman of the Board  
Vintage Petroleum, Inc.

J. W. Stewart  
Chairman, President and  
Chief Executive Officer  
BJ Services Company

James H. Stone  
Chairman of the Board  
Stone Energy Corporation

Carroll W. Suggs  
New Orleans, Louisiana

Patrick F. Taylor  
Chairman and  
Chief Executive Officer  
Taylor Energy Company

James Cleo Thompson, Jr.  
President  
Thompson Petroleum Corporation

Gerald Torres  
Associate Dean for Academic Affairs  
University of Texas School of Law and  
Vice Provost  
University of Texas at Austin

Diemer True  
Partner  
True Companies, Inc.

H. A. True, III  
Partner  
True Oil Company

Paul G. Van Wagenen  
Chairman, President and  
Chief Executive Officer  
Pogo Producing Company

Randy E. Velarde  
President  
The Plaza Group

Thurman Velarde  
Administrator  
Oil and Gas Administration  
Jicarilla Apache Tribe

Philip K. Verleger, Jr.  
PKVerleger, L.L.C.

Vincent Viola  
Chairman of the Board  
New York Mercantile Exchange

Joseph C. Walter, III  
President  
Walter Oil & Gas Corporation

L. O. Ward  
Chairman and  
Chief Executive Officer  
Ward Petroleum Corporation

## NATIONAL PETROLEUM COUNCIL

Wm. Michael Warren, Jr.  
Chairman, President and  
Chief Executive Officer  
Energen Corporation

J. Robinson West  
Chairman of the Board  
The Petroleum Finance Company

Michael E. Wiley  
Chairman, President and  
Chief Executive Officer  
Baker Hughes Incorporated

Bruce W. Wilkinson  
Chairman of the Board and  
Chief Executive Officer  
McDermott International, Inc.

Charles R. Williamson  
Chairman of the Board and  
Chief Executive Officer  
Unocal Corporation

Mary Jane Wilson  
President and  
Chief Executive Officer  
WZI Inc.

Brion G. Wise  
Chairman and  
Chief Executive Officer  
Western Gas Resources, Inc.

William A. Wise  
Retired Chairman  
El Paso Corporation

Donald D. Wolf  
Chairman of the Board and  
Chief Executive Officer  
Westport Resources Corp.

George M. Yates  
President and  
Chief Executive Officer  
Harvey E. Yates Company

John A. Yates  
President  
Yates Petroleum Corporation

Daniel H. Yergin  
President  
Cambridge Energy Research Associates

Henry Zarrow  
Vice Chairman  
Sooner Pipe & Supply Corporation

# **Appendix B**

---

## **Study Group Rosters**

**NATIONAL PETROLEUM COUNCIL**  
**COMMITTEE ON NATURAL GAS**

---

**INTERIM CHAIR**

Bobby S. Shackouls  
Chair  
National Petroleum Council

**VICE CHAIR, DEMAND**

Robert B. Catell  
Chairman and  
Chief Executive Officer  
KeySpan

**VICE CHAIR, SUPPLY**

Lee R. Raymond  
Chairman and  
Chief Executive Officer  
Exxon Mobil Corporation

**GOVERNMENT COCHAIR**

Robert G. Card  
Under Secretary of Energy

**VICE CHAIR, MIDSTREAM**

Richard D. Kinder  
Chairman and  
Chief Executive Officer  
Kinder Morgan Energy Partners, L.P.

**SECRETARY**

Marshall W. Nichols  
Executive Director  
National Petroleum Council

\* \* \*

George A. Alcorn, Sr.  
President  
Alcorn Exploration, Inc.

Thos. E. Capps  
Chairman, President and  
Chief Executive Officer  
Dominion

Conrad K. Allen  
President  
National Association of Black Geologists  
and Geophysicists

Clarence P. Cazalot, Jr.  
President  
Marathon Oil Company

Robert J. Allison, Jr.  
Chairman, President and  
Chief Executive Officer  
Anadarko Petroleum Corporation

Luke R. Corbett  
Chairman and  
Chief Executive Officer  
Kerr-McGee Corporation

Alan L. Boeckmann  
Chairman and  
Chief Executive Officer  
Fluor Corporation

E. Linn Draper, Jr.  
Chairman, President and  
Chief Executive Officer  
American Electric Power Co., Inc.

Wayne H. Brunetti  
Chairman, President and  
Chief Executive Officer  
Xcel Energy Inc.

Archie W. Dunham  
Chairman of the Board  
ConocoPhillips

## NPC COMMITTEE ON NATURAL GAS

Stephen E. Ewing  
President and  
Chief Operating Officer  
DTE Energy Gas

William L. Fisher  
Barrow Chair in Mineral Resources  
Department of Geological Sciences and  
Director of the Jackson School of Geoscience  
University of Texas at Austin

Eric O. Fornell  
Managing Director and  
Group Executive  
Global Natural Resources Group  
J. P. Morgan Securities Inc.

Robert W. Fri  
Visiting Scholar  
Resources For the Future Inc.

James A. Gibbs  
Chairman  
Five States Energy Company

Andrew Gould  
Chairman and  
Chief Executive Officer  
Schlumberger Limited

James T. Hackett  
President and  
Chief Operating Officer  
Devon Energy Corporation

Lewis Hay, III  
Chairman, President and  
Chief Executive Officer  
FPL Group

Frank O. Heintz  
President and  
Chief Executive Officer  
Baltimore Gas and Electric Company

Ray R. Irani  
Chairman and  
Chief Executive Officer  
Occidental Petroleum Corporation

Jon Rex Jones  
Chairman  
EnerVest Management Company, L. C.

Jerry D. Jordan  
President  
Jordan Energy Inc.

Fred C. Julander  
President  
Julander Energy Company

W. Robert Keating  
Commissioner  
Department of Telecommunications  
and Energy  
Commonwealth of Massachusetts

W. Gary McGilvray  
President and  
Chief Executive Officer  
DeGolyer and MacNaughton

Steven J. Malcolm  
President and  
Chief Executive Officer  
The Williams Companies, Inc.

James J. Mulva  
President and  
Chief Executive Officer  
ConocoPhillips

Gary L. Neale  
Chairman, President and  
Chief Executive Officer  
NiSource Inc.

J. Larry Nichols  
Chairman of the Board and  
Chief Executive Officer  
Devon Energy Corporation

Erle Nye  
Chairman of the Board and  
Chief Executive  
TXU Corp.

Christine J. Olson  
Chairman and  
Chief Executive Officer  
S. W. Jack Drilling Company

David J. O'Reilly  
Chairman of the Board and  
Chief Executive Officer  
ChevronTexaco Corporation



## NPC COMMITTEE ON NATURAL GAS

Mark G. Papa  
Chairman and  
Chief Executive Officer  
EOG Resources, Inc.

Paul H. Parker  
Vice President  
Center for Resource Management

Robert L. Parker, Sr.  
Chairman of the Board  
Parker Drilling Company

Ross J. Pillari  
President  
BP America Inc.

Keith O. Rattie  
President and  
Chief Executive Officer  
Questar Corporation

John G. Rice  
President and  
Chief Executive Officer  
GE Power Systems

Robert E. Rose  
Chairman of the Board  
GlobalSantaFe Corporation

Robert J. Routs  
Former President  
and Country Chairman  
Shell Oil Company

S. Scott Sewell  
President  
Delta Energy Management, Inc.

Matthew R. Simmons  
Chairman and  
Chief Executive Officer  
Simmons and Company International

J. W. Stewart  
Chairman, President and  
Chief Executive Officer  
BJ Services Company

Diemer True  
Partner  
True Companies, Inc.

Vincent Viola  
Chairman of the Board  
New York Mercantile Exchange

Wm. Michael Warren, Jr.  
Chairman, President and  
Chief Executive Officer  
Energen Corporation

J. Robinson West  
Chairman of the Board  
The Petroleum Finance Company

Charles R. Williamson  
Chairman of the Board and  
Chief Executive Officer  
Unocal Corporation

William A. Wise  
Retired Chairman  
El Paso Corporation

Daniel H. Yergin  
President  
Cambridge Energy Research Associates

**NATIONAL PETROLEUM COUNCIL**  
**COORDINATING SUBCOMMITTEE**  
**OF THE**  
**NPC COMMITTEE ON NATURAL GAS**

---

**CHAIR**

Jerry J. Langdon  
Executive Vice President and  
Chief Administrative Officer  
Reliant Resources, Inc.

**ASSISTANT TO THE CHAIR**

Byron S. Wright  
Vice President  
Strategy and Capacity Pricing  
El Paso Pipeline Group

**GOVERNMENT COCHAIR**

Carl Michael Smith  
Assistant Secretary  
Fossil Energy  
U.S. Department of Energy

**ALTERNATE GOVERNMENT COCHAIR**

James A. Slutz  
Deputy Assistant Secretary  
Natural Gas and Petroleum Technology  
U.S. Department of Energy

**SECRETARY**

John H. Guy, IV  
Deputy Executive Director  
National Petroleum Council

\* \* \*

George A. Alcorn, Sr.  
President  
Alcorn Exploration, Inc.

Keith Barnett  
Vice President  
Fundamental Analysis  
American Electric Power Co., Inc.

Mark A. Borer  
Executive Vice President  
Duke Energy Field Services

Jon C. Cole  
Vice President  
Business Development  
and Marketing  
ENSCO International Inc.

V. W. Holt  
Vice President  
Onshore U.S.  
BP America Production Inc.

Robert G. Howard, Jr.  
Vice President  
North America Upstream  
ChevronTexaco Corporation

John Hritcko, Jr.  
Vice President  
Shell NA, LNG, Inc.  
Shell US Gas & Power Company

W. Robert Keating  
Commissioner  
Department of Telecommunications  
and Energy  
Commonwealth of Massachusetts

Paul D. Koonce  
Senior Vice President  
Portfolio Management  
Dominion Energy, Inc.

Patrick J. Kuntz  
Vice President  
Natural Gas and  
Crude Oil Sales  
Marathon Oil Company

**COORDINATING SUBCOMMITTEE OF THE  
NPC COMMITTEE ON NATURAL GAS**

Mark T. Maassel  
Vice President  
Regulatory & Government Policy  
NiSource Inc.

David J. Manning  
Senior Vice President  
Corporate Affairs  
KeySpan

Thomas B. Nusz  
Vice President  
Acquisitions  
Burlington Resources Inc.

John E. Olson  
Senior Vice President and  
Director of Research  
Sanders Morris Harris

Scott E. Parker  
President  
Natural Gas Pipeline Company  
of America

Mark L. Pease  
Vice President  
U.S. Onshore & Offshore  
Anadarko Petroleum Corporation

Mark A. Sikkell  
Vice President  
ExxonMobil Production Company

Andrew K. Soto  
Advisor to the Chairman  
Federal Energy Regulatory Commission

Lee M. Stewart  
Senior Vice President  
Gas Transmission  
Southern California Gas Company and  
San Diego Gas & Electric Company  
Sempra Energy Utilities

Lawrence H. Towell  
Vice President, Acquisitions  
Kerr-McGee Corporation

Rebecca W. Watson  
Assistant Secretary  
Land and Minerals Management  
U.S. Department of the Interior

Dena E. Wiggins  
General Counsel  
Process Gas Consumers Group

Michael Zenker  
Director  
North American Natural Gas  
Cambridge Energy Research Associates

**SPECIAL ASSISTANTS**

Ronald L. Brown  
Vice President  
Storage Management &  
System Design  
Kinder Morgan Inc.

Brian W. Miller  
Director  
U.S. Government and International Affairs  
BP America Inc.

Harlan Chappelle  
Staff Consultant – Energy Policy  
KeySpan

William N. Strawbridge  
Reservoir Engineering Manager  
ExxonMobil Production Company

**NATIONAL PETROLEUM COUNCIL**  
**DEMAND TASK GROUP**  
**OF THE**  
**NPC COMMITTEE ON NATURAL GAS**

---

**CHAIR**

David J. Manning  
Senior Vice President  
Corporate Affairs  
KeySpan

**ASSISTANT TO THE CHAIR**

Harlan Chappelle  
Staff Consultant – Energy Policy  
KeySpan

**GOVERNMENT COCHAIR**

Mark R. Maddox  
Principal Deputy Assistant Secretary  
Fossil Energy  
U.S. Department of Energy

**ALTERNATE GOVERNMENT COCHAIR**

Wade W. Murphy  
Executive Assistant  
Natural Gas & Petroleum Technologies  
Office of Fossil Energy  
U.S. Department of Energy

**SECRETARY**

Benjamin A. Oliver, Jr.  
Senior Committee Coordinator  
National Petroleum Council

\* \* \*

Barry D. Anderson  
Operations Manager  
Florida Power & Light Company

Keith Barnett  
Vice President  
Fundamental Analysis  
American Electric Power Co., Inc

Ronald S. Barr  
Advisor  
ExxonMobil Gas &  
Power Marketing

J. Michael Bodell  
Manager  
Strategic Planning and  
Market Analysis  
Midstream & Trade  
Unocal Corporation

Mark A. Borer  
Executive Vice President  
Duke Energy Field Services

Mark S. Crews  
Director  
Southern Company

Leslie J. Deman  
Director  
Fundamental Research  
Shell Trading Gas & Power

Mark J. Finley  
Senior Economist  
BP America Inc.

Edward J. Gilliard  
Senior Advisor  
Planning and Acquisitions  
Burlington Resources Inc.

R. William Jewell  
Vice President  
Energy and Fuels  
Dow Hydrocarbons and  
Resources Inc.

**DEMAND TASK GROUP OF THE  
NPC COMMITTEE ON NATURAL GAS**

Marianne S. Kah  
Chief Economist  
ConocoPhillips

Seth S. Roberts  
Risk Manager – Energy  
Dow Hydrocarbons and Resources Inc.

Donald R. Knop  
Economic and Planning Consultant  
Williams Gas Pipelines

Charles Greer Rossmann  
Senior Research Economist  
Research and Environmental Affairs  
Southern Company

Diane G. Leopold  
Director  
Business Planning &  
Market Analysis  
Dominion Energy, Inc.

Mark Schroeder  
Vice President  
Regulatory Affairs  
El Paso Merchant Energy Group

Charles W. Linderman  
Director  
Energy Supply Policy  
Alliance of Energy Suppliers

Loren K. Starcher  
Project Manager  
PGS – Power Projects  
ExxonMobil Gas &  
Power Marketing Company

Ronald G. Lukas  
Vice President  
Trading Services  
KeySpan

Jone-Lin Wang  
Director  
North American Electric Power  
Cambridge Energy Research Associates

Steven W. Miller  
Director  
Project Evaluation  
San Diego Gas & Electric

Dena E. Wiggins  
General Counsel  
Process Gas Consumers Group

Vance C. Mullis  
Assistant to the President and  
Chief Executive Officer  
Southern Company Gas

Byron S. Wright  
Vice President  
Strategy and Capacity Pricing  
El Paso Pipeline Group

**NATIONAL PETROLEUM COUNCIL**  
**SUPPLY TASK GROUP**  
**OF THE**  
**NPC COMMITTEE ON NATURAL GAS**

---

**CHAIR**

Mark A. Sikkel  
Vice President  
ExxonMobil Production Company

**ASSISTANT TO THE CHAIR**

William N. Strawbridge  
Reservoir Engineering Manager  
ExxonMobil Production Company

**GOVERNMENT COCHAIR**

Elena S. Melchert  
Program Manager  
Oil & Gas Production  
Office of Fossil Energy  
U.S. Department of Energy

**SECRETARY**

John H. Guy, IV  
Deputy Executive Director  
National Petroleum Council

\* \* \*

George A. Alcorn, Sr.  
President  
Alcorn Exploration, Inc.

Robert G. Howard, Jr.  
Vice President  
North America Upstream  
ChevronTexaco Corporation

Ronald S. Barr  
Advisor  
ExxonMobil Gas &  
Power Marketing Company

John Hritcko, Jr.  
Vice President  
Shell NA, LNG, Inc.  
Shell US Gas & Power Company

G. David Blackmon  
Manager  
Corporate Affairs  
Burlington Resources Inc.

Patrick J. Kuntz  
Vice President  
Natural Gas and  
Crude Oil Sales  
Marathon Oil Company

Randall L. Couch  
General Manager  
Engineering & Technology  
Anadarko Petroleum Corporation

Ryan M. Lance  
Vice President, Lower 48  
ConocoPhillips

David J. Crowley  
Vice President, Marketing  
TODCO

Thomas H. Pielech  
Manager of Marketing  
Ocean Energy Inc.

Edward J. Gilliard  
Senior Advisor  
Planning and Acquisitions  
Burlington Resources Inc.

Mark O. Reid  
Vice President  
Offshore Exploitation/Development  
El Paso Production Company

**SUPPLY TASK GROUP OF THE  
NPC COMMITTEE ON NATURAL GAS**

Robert D. Schilhab  
Manager  
Alaska Gas Development  
ExxonMobil Production Company

Robert W. Stancil  
Chief Geologist  
Anadarko Petroleum Corporation

Andrew J. Slaughter  
Senior Economics Advisor-EP Americas  
Shell Exploration & Production Company

Gary C. Stone  
Supervisor  
Technical Advisors  
ExxonMobil Exploration Company

Brent J. Smolick  
Vice President and Chief Engineer  
Burlington Resources Inc.

Chad A. Tidwell  
Strategy Manager  
BP America Production Inc.

Gerry A. Worthington  
Area Manager  
South America North and West  
ExxonMobil Exploration Company

**NATIONAL PETROLEUM COUNCIL**  
**TRANSMISSION & DISTRIBUTION TASK GROUP**  
**OF THE**  
**NPC COMMITTEE ON NATURAL GAS**

---

**CHAIR**

Scott E. Parker  
President  
Natural Gas Pipeline Company  
of America

**ASSISTANT TO THE CHAIR**

Ronald L. Brown  
Vice President  
Storage Management &  
System Design  
Kinder Morgan Inc.

**GOVERNMENT COCHAIR**

Mark R. Maddox  
Principal Deputy Assistant Secretary  
Fossil Energy  
U.S. Department of Energy

**SECRETARY**

Benjamin A. Oliver, Jr.  
Senior Committee Coordinator  
National Petroleum Council

\* \* \*

Stephen C. Alleman  
Manager  
Business Optimization  
ConocoPhillips

Jeffrey A. Holligan  
Regulatory Consultant  
BP Energy Company

Steven D. Becker  
Vice President  
Gas Development  
TransCanada Pipelines Limited

Mark T. Maassel  
Vice President  
Regulatory & Government Policy  
NiSource Inc.

James J. Cleary  
President  
ANR Pipeline Company

Terrance L. McGill  
Vice President  
Commerical Activity &  
Business Development  
Enbridge (U.S.) Inc.

Dawn M. Constantin  
Leader  
Term Fundamental Analysis  
BP North America Gas & Power

Joseph L. Ratigan  
Vice President and  
Principal Consultant  
PB Energy Storage Services, Inc.

Richard C. Daniel  
Senior Vice President  
EnCana Corporation

Edward J. Gilliard  
Senior Advisor  
Planning and Acquisitions  
Burlington Resources Inc.

Bradford D. Reese  
Senior Vice President Northern Development and  
Co-Chief Executive Officer Foothills Pipeline  
Duke Energy Gas Transmission – Canada



**TRANSMISSION & DISTRIBUTION TASK GROUP OF THE  
NPC COMMITTEE ON NATURAL GAS**

Stephen T. Riestler  
Transportation Advisor  
ExxonMobil Gas Marketing Company

Kyle M. Sawyer  
Consultant  
Strategy  
El Paso Pipeline Group

Walter M. Simmons  
Vice President, Strategic Planning  
Gas Pipeline Group  
Kinder Morgan Inc.

J. Gregory Snyder  
Project Leader  
Business Planning and  
Market Analysis  
Dominion Energy, Inc.

Andrew K. Soto  
Advisor to the Chairman  
Federal Energy Regulatory Commission

Byron S. Wright  
Vice President  
Strategy and Capacity Pricing  
El Paso Pipeline Group

# Subgroup Rosters

Rosters for the subgroups listed below will be included in the final, printed report.

## Coordinating Subcommittee

- Financial Team
- Price Volatility Team
- Modeling Team
- Communications Team

## Demand Task Group

- Economy & Demographics Subgroup
- Power Generation Subgroup
- Residential & Commercial Subgroup
- Industrial Utilization Subgroup

## Supply Task Group

- Resource Subgroup
- Technology Subgroup
- Environmental/Regulatory/Access Subgroup
- LNG Subgroup
- Arctic Subgroup

## Transmission & Distribution Task Group

- Transmission Subgroup
- Distribution Subgroup
- Storage Subgroup

### **Additional Study Participants**

The National Petroleum Council wishes to acknowledge the numerous other individuals and companies who participated in some aspects of the work effort through workshops, outreach meetings and other contacts. Their time, energy, and commitment significantly enhanced the study and their contributions are greatly appreciated.

# Acronyms and Abbreviations

APD	application for permit to drill
BCF	billion cubic feet
BCF/D	billion cubic feet per day
Btu	British thermal unit
CNG	compressed natural gas
CO <sub>2</sub>	carbon dioxide
DOE	U.S. Department of Energy
EEA	Energy and Environmental Analysis, Inc.
EIA	Energy Information Administration
FERC	Federal Energy Regulatory Commission
GDP	Gross Domestic Product
GW	gigawatts
LDC	local distribution company
LNG	liquefied natural gas
MACT	Maximum Achievable Control Technology
MM	million
MMBtu	million British thermal units
MMCF	million cubic feet
MMCF/D	million cubic feet per day
MMS	Minerals Management Service
MOUs	Memorandums of Understanding
NEPA	National Environmental Policy Act
NGL	natural gas liquid
NGPA	National Gas Policy Act
NO <sub>x</sub>	nitrogen oxides
NPC	National Petroleum Council
OCS	Outer Continental Shelf
PIFUA	Powerplant and Industrial Fuel Use Act of 1978
PUC	Public Utility Commission
RTOS	Regional Transmission Organizations
SO <sub>x</sub>	sulfur oxides
TCF	trillion cubic feet
USGS	United States Geological Service
WCSB	Western Canadian Sedimentary Basin

# Glossary

## **Access**

The legal right to:

1. Drill and develop oil and natural gas resources
2. Build associated production facilities
3. Build transmission and distribution facilities

on either public and/or private land.

## **Basis**

The difference in price for natural gas at two different geographical locations.

## **Capacity, Peaking**

The capacity of facilities or equipment normally used to supply incremental gas or electricity under extreme demand conditions. Peaking capacity is generally available for a limited number of days at maximum rate.

## **Capacity, Pipeline**

The maximum throughput of natural gas over a specified period of time for which a pipeline system or portion thereof is designed or constructed, not limited by existing service conditions.

## **City Gate**

The point at which interstate and intrastate pipelines sell and deliver natural gas to local distribution companies.

## **Cogeneration**

The sequential production of electricity and useful thermal energy from the same energy source, such as steam. Natural gas is a favored fuel for combined-cycle cogeneration units, in which waste heat is converted to electricity.

## **Commercial**

A sector of customers or service defined as non-manufacturing business establishments, including hotels, motels, restaurants, wholesale businesses, retail stores, and health, social, and educational institutions.

## **Compressed Natural Gas (CNG)**

Natural gas cooled to a temperature below 32°F and compressed to a pressure ranging from 1,000 to 3,000 pounds per square inch in order to allow the transportation of large quantities of natural gas.

## **Cost Recovery**

The recovery of permitted costs, plus an acceptable rate of return, for an energy infrastructure project.

**Cubic Foot**

The most common unit of measurement of gas volume; the amount of gas required to fill a volume of one cubic foot under stated conditions of temperature, pressure, and water vapor.

**Distribution Line**

Natural gas pipeline system, typically operated by a local distribution company, for the delivery of natural gas to end users.

**Electric**

A sector of customers or service defined as generation, transmission, distribution, or sale of electric energy.

**End-User**

One who actually consumes energy, as opposed to one who sells or re-sells it.

**FERC (Federal Energy Regulatory Commission)**

The federal agency that regulates interstate gas pipelines and interstate gas sales under the Natural Gas Act.

**Firm Customer**

A customer who has contracted for firm service.

**Firm Service**

Service offered to customers under schedules or contracts that anticipate no interruptions, regardless of class of service, except for force majeure.

**Fuel Switching**

Substituting one fuel for another based on price and availability. Large industries often have the capability of using either oil or natural gas to fuel their operation and of making the switch on short notice.

**Fuel-Switching Capability**

The ability of an end-user to readily change fuel type consumed whenever a price or supply advantage develops for an alternative fuel.

**Gigawatts**

One billion watts.

**Henry Hub**

A pipeline interchange near Erath, Louisiana, where a number of interstate and intrastate pipelines interconnect through a header system operated by Sabine Pipe Line. The standard delivery point for the New York Mercantile Exchange natural gas futures contract.

**Industrial**

A sector of customers or service defined as manufacturing, construction, mining, agriculture, fishing, and forestry.

**Liquefied Natural Gas (LNG)**

The liquid form of natural gas, which has been cooled to a temperature  $-256^{\circ}\text{F}$  or  $-161^{\circ}\text{C}$  and is maintained at atmospheric pressure. This liquefaction process reduces the volume of the gas by approximately 600 times its original size.

**Load Profiles**

Gas usage over a specific period of time, usually displayed as a graphical plot.

**Local Distribution Company (LDC)**

A company that obtains the major portion of its natural gas revenues from the operations of a retail gas distribution system and that operates no transmission system other than incidental connections within its own or to the system of another company. An LDC typically operates as a regulated utility within specified franchise area.

**Marketer (natural gas)**

A company, other than the pipeline or LDC, that buys and resells gas or brokers gas for a profit. Marketers also perform a variety of related services, including arranging transportation, monitoring deliveries and balancing. An independent marketer is not affiliated with a pipeline, producer or LDC.

**New Fields**

A quantification of resources estimated to exist outside of known fields on the basis of broad geologic knowledge and theory; in practical terms, these are statistically determined resources likely to be discovered in additional geographic areas with geologic characteristics similar to known producing regions, but which are as yet untested with the drillbit.

**Nonconventional Gas**

Natural gas produced from coalbed methane, shales, and low permeability reservoirs. Gas production from these environments typically requires a different, sometime higher, level of technology than gas production from conventional reservoirs.

**Peak-Day Demand**

The maximum daily quantity of gas used during a specified period, such as a year.

**Peak Shaving**

Methods to reduce the peak demand for gas or electricity. Common examples are storage and use of LNG.

**Proved Reserves**

The most certain of the resource base categories representing estimated quantities that analysis of geological and engineering data demonstrate with reasonable certainty to be recoverable in future years from known reservoirs under existing economic and operating conditions; generally, these gas deposits have been “booked,” or accounted for as assets on the SEC financial statements of their respective companies.

**Regional Transmission Organization (RTO)**

Voluntary organization of transmission owners, transmission users, and other entities interested in coordinating transmission planning, expansion, and use on a regional and interregional basis.

**Residential**

The residential sector is defined as private household establishments which consume energy primarily for space heating, water heating, air conditioning, lightning, refrigeration, cooking, and clothes drying.

**Revenue**

The total amount money received by a firm from sales of its products and/or services.

**Shipper**

One who contracts with a pipeline for transportation of natural gas and who retains title to the gas while it is being transported by the pipeline.

**Terrawatts**

One trillion watts.

**Watt**

The common U.S. measure of electrical power.