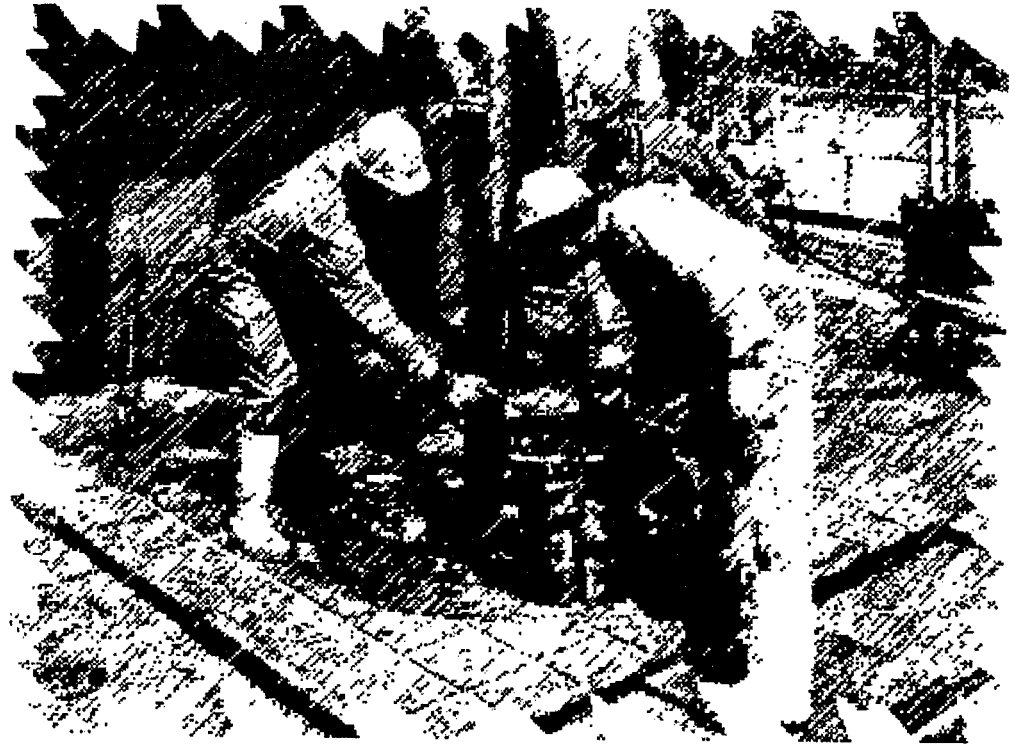


# NATURAL GAS

**MULTI-YEAR PROGRAM PLAN**



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December 1997

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**Department of Energy**  
**Washington, DC 20585**

To Our Readers:

This document comprises the Department of Energy's Natural Gas Multi-Year Program Plan. The research, development, and demonstration (RD&D) program activities crosscut the Offices of Fossil Energy, Energy Efficiency and Renewable Energy, Energy Research, and the Energy Information Administration. Specific activities are carried out and funded either independently by each Office or jointly, depending on the Office mission, program focus, crosscutting programmatic relationships, and budgetary considerations.

The Multi-Year Program Plan consists of the following technology areas: Natural Gas Supply, Delivery and Storage, Power Generation, Industrial, Residential and Commercial, Natural Gas Vehicles, and the Environment. The overall RD&D program strategy has been developed by a Department-wide planning Committee charged with ensuring that all natural gas programs are conducted with a single strategic focus to provide a united and integrated program to the natural gas industry and stakeholders.

I would like to give special recognition to Albert Yost, Federal Energy Technology Center, for his efforts as the Chairman of the Natural Gas Multi-Year Program Plan development task force, and the Department-wide program staff for their contributions.

We invite your comments and questions regarding this report or the programs described therein. The Committee and the individual program area contacts are listed inside the back cover of this report.

A handwritten signature in cursive script that reads "Sandra L. Waisley".

Sandra L. Waisley  
Deputy Assistant Secretary (Acting) for  
Natural Gas and Petroleum Technology  
Office of Fossil Energy

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# NATURAL GAS MULTI-YEAR PROGRAM PLAN

U.S. DEPARTMENT OF ENERGY

Office of Fossil Energy  
Office of Energy Research  
Office of Energy Efficiency and Renewable Energy  
Energy Information Administration



December 1997

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U.S. Department of Energy Natural Gas RD&D Program Contacts

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## ACRONYMS AND ABBREVIATIONS

### A

ABSIM	Absorption Simulation
AC	Alternating Current
AEO	Annual Energy Outlook
AGA	American Gas Association
ANL	Argonne National Laboratory
AOF	Absolute Open Flow
ASHRE	American Society of Heating, Refrigeration, and Air Conditioning Engineers
ASTM	American Society for Testing and Materials
ATS	Advanced Turbine System

### B

BAGI	Backscatter Absorption Gas Imaging
BTS	Office of Building Technology, State and Community Programs
Btu	British Thermal Unit

### C

CAAA	Clean Air Act Amendments of 1990
CANMET	Canada Center for Mineral and Energy Technology
CCNG	Consortium on the Conversion of Natural Gas
CENPES	Centro de Pesquisa e Desenvolvimento
CFC	Chlorofluorocarbon
CFCCs	Continuous Fiber Ceramic Composites
CGA	Canadian Gas Association
CIT	Chemical Industry Team
CNG	Compressed Natural Gas
COP <sub>c</sub>	Coefficient of Performance for Cooling
COP <sub>h</sub>	Coefficient of Performance for Heating
CRADA	Cooperative Research and Development Agreement

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**D**

DC	Direct Current
DCC	Double Condenser Coupling
DOC	Department of Commerce
DOD	Department of Defense
DOE	Department of Energy
DOT	Department of Transportation

**E**

EE	Office of Energy Efficiency and Renewable Energy (DOE)
EIA	Energy Information Administration (DOE)
EOB	Extreme Over Balanced
E&P	Exploration and Production
EPACT	Energy Policy Act of 1992
EPRI	Electric Power Research Institute

**F**

FE	Office of Fossil Energy
FERC	Federal Energy Regulatory Commission
FETC	Federal Energy Technology Center (DOE)
FY	Fiscal Year

**G**

GASIS	Gas Information System
GAX	Generator Absorber Heat Exchanger
GGRB	Greater Green River Basin
GRI	Gas Research Institute
GSAM	Gas Systems Analysis Model
GTI	Gas Technology Information
GSAM	Gas Systems Analysis Model

**H**

HCFC	Hydrofluorocarbon
HD	Heavy Duty

---

HQ	Headquarters
HVAC	Heating, Ventilation, and Air Conditioning
<b>I</b>	
IAQ	Indoor Air Quality
IEA	International Energy Agency
ICGTI	International Center for Gas Technology Information
IGT	Institute of Gas Technology
ILEV	Inherently Low Emission Vehicle
INEEL	Idaho National Engineering and Environmental Laboratory
IOGCC	Interstate Oil and Gas Compact Commission
IRP	Integrated Resource Planning
ISS	Integrated Storage System
<b>K</b>	
kW	Kilowatt
<b>L</b>	
LANL	Los Alamos National Laboratory
LBL	Lawrence Berkeley Laboratory
LHV	Low Heating Value
LiBr	Lithium Bromide
LNG	Liquefied Natural Gas
LQNG	Low Quality Natural Gas
LWSA	Low Weight Solid Additive
<b>M</b>	
Mcf	Thousand Cubic Feet
MCFC	Molten Carbonate Fuel Cell
MMTce	Million Metric Tons of Carbon Equivalent
MRF	Meter Research Facility
MW	Megawatt
MWD	Measurement-While-Drilling
MWX	Multiwell Experiment

---

**N**

NAFTA	North American Free Trade Agreement
NASA	National Aeronautics and Space Administration
NEPA	National Environmental Policy Act
NGU	Natural Gas Upgrading
NH <sub>3</sub>	Ammonia
NIPSCO	Northern Indiana Public Supply Company
NORM	Naturally Occurring Radioactive Materials
NO <sub>x</sub>	Nitrogen Oxide
NPC	National Petroleum Council
NREL	National Renewable Energy Laboratory
NUGs	Non-Utility Generators
N <sub>2</sub> O	Nitrous Oxide

**O**

OATT	Office of Advanced Automotive Technologies
OCH	Oxyhydrochlorination
OEAS	Oxygen-enriched Air-staging
OECD	Organization for Economic Cooperation and Development
OHVT	DOE Office of Heavy Vehicle Technologies
OIT	DOE Office of Industrial Technologies
ORNL	Oak Ridge National Laboratory
OTT	DOE Office of Transportation Technologies

**P**

PEM	Proton Exchange Membrane
PEMFC	Proton Exchange Membrane Fuel Cell
PNGV	Partnership for a New Generation of Vehicles
ppm	Parts per Million
PTTC	Petroleum Technology Transfer Council
POX	Partial Oxidation

---

**Q**

quad                      Quadrillion Btu

**R**

RAM                      Reliability-Availability-Maintainability

R&D                      Research and Development

RD&D                    Research, Development, and Demonstration

ROP                      Rate of Penetration

**S**

SBIR                      Small Business Innovations Research

SCERDC                 South Carolina Energy and Research Development Center

SFE                      Staged Field Experiment

SIC                      Standard Industrial Classifications

SING                      Spark-Ignited Natural Gas

SNL                      Sandia National Laboratory

SOFC                      Solid Oxide Fuel Cell

SWRI                      Southwest Research Institute

**T**

TAD-OPTR                Thermoacoustic Driver-Orifice Pulse Tube Refrigerator

TAHP                      Thermally Activated Heat Pump

TBD                      To Be Determined

Tcf                      Trillion Cubic Feet

T/E                      Thermal-to-Electric

TRI                      Toxic Release Inventory

TRIT                      Turbine Rotor Inlet Temperature

TSD                      Thermally Stable Diamond

2-D                      Two Dimensional

3-D                      Three Dimensional

---

**U**

ULEV	Ultra Low Emission Vehicle
USAQ	United States Air Quality
USGS	United States Geological Survey

**V**

VISTA	Vortex Inertial Staged Air
VMT	Vehicle-Miles-Traveled
VOC	Volatile Organic Compounds

**W**

WGC'96	World Gas Conference '96
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**V**

VSP	Vertical Seismic Profile
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