

United States Environmental Protection Agency Air and Radiation 6202J

NATURAL GAS STAR Natural Gas

Winter 2001

Higher Gas Prices Mean Greater Cost Savings from Reducing Methane Emissions

Natural gas has never been a more valuable commodity! With elevated gas prices and demand at an all-time high, some gas companies may see a welcome boost to profits. Today's high prices also mean that operators are likely to have additional costeffective opportunities to reduce methane emissions and increase gas sales. With annual industry-wide emissions estimated at 312 Bcf and well-head prices averaging \$4.00/Mcf and higher, approximately \$1.2 billion of natural gas are lost to the atmosphere each year. Now is a good time to take a second look at gas leaks and losses that were not economic to address at lower prices. (continued on page 2)

Potential Cost Savings at \$4/Mcf and \$6/Mcf

Action	Annual Volume of Gas Lost	Value of Gas Saved at \$4/Mcf	Value of Gas Saved at \$6/Mcf	Implementation Cost		oack onths \$6/Mc1
Replace wet seals with dry seals in centrifugal compressors	45,120 Mcf	\$180,480	\$270,720	\$240,000	8.8	5.9
Directed inspection and maintenance at compressor stations	2,585 Mcf per station on average	\$10,340 per station on average	\$15,510 per station on average	\$2,065 per station on average	N/A	N/A
Install static seal/maintain pressure in off-line compressors	5,600 Mcf	\$22,400	\$33,600	\$3,000	1.6	1.0
Directed inspection and maintenance at gate station and surface facilities	385 Mcf s	\$1,540	\$2,310	\$295 per station	N/A	N/A
Reduce TEG circulation rates in dehydration units	130 to 13,140 Mcf	\$320 to \$52,560	\$480 to \$78,840	Negligible	Imme	ediate
Replace high-bleed pneumatic devices with low-bleed devices	50 to 200 Mcf	\$200 to \$800	\$300 to \$1200	\$150 to \$250	2.3-1.5	1.5-10
Economic replacement of rings and rods in compressor rod packing systems	80 Mcf	\$320	\$480	\$100	3.7	2.5
Install flash tank separators (energy exchange pump, 300 gal/hr TEG circulation r	7,095 Mcf ate)	\$31,080	\$46,620	\$7,160	2.8	1.9

Higher Gas Prices Mean Greater Cost Savings

continued from page 1

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Historically, Natural Gas STAR has used \$2.00/Mcf to calculate savings and evaluate economic opportunities from methane emission reduction technologies and practices. Given today's higher gas prices, potential savings are even more impressive, and payback periods are significantly shorter. The table on page 1 demonstrates possible savings and

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payback periods for selected STAR Best Management Practices and Partner Reported Opportunities, using gas prices of \$4.00/Mcf and \$6.00/Mcf.

We hope this information will encourage you to consider which practices and technologies will boost your company's bottom line.

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To showcase the methane reduction efforts of Gas STAR Partners and promote the Natural Gas STAR Program, this public service announcement appeared pro bono in the December 1999 issue of Pipeline & Gas Industry and in the March 2000 issue of American Gas.

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When change is in the air...leaders emerge.

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ANR Pipeline Atlanta Gas Light **Baltimore Gas & Electric Bay State Gas** Brooklyn Union/Keyspan Energy Central Hudson Gas & Electric Citizens Gas & Coke Utility **Colorado Interstate Gas** Columbia Gas of KY, MD, OH, PA, VA **Columbia Gas Transmission** Columbia Gulf Transmission **Conectiv Power Delivery Consolidated Edison Consumers Energy** El Paso Natural Gas Enron Gas Pipeline Group **Equitable Resources** Granite State Gas Transmission Great Lakes Gas Transmission Iroquois Gas Transmission Kansas Operating Pipeline Koch Gateway Pipeline LG&E Gas Division Michigan Consolidated Gas **MidCon Texas Pipeline** Natural Gas Pipeline Company of America

New York State Electric & Gas Niagara Mohawk Power Northern Indiana Public Service Northern IItilities Northwest Natural Gas **Orange & Rockland Utilities** Pacific Gas & Electric PECO Energy **Public Service Company** of North Carolina Public Service Electric & Gas **Reliant Energy Minnegasco Rochester Gas & Electric** South Carolina Electric & Gas Southern California Gas Southern Natural Gas Southwest Gas Superior Water, Light & Power Tennessee Gas Pipeline **UGI Utilities** UtiliCorp United Washington Gas Williams Gas Pipeline-Central Williams-Texas Gas Transmission Williams—Transco Wisconsin Public Service

These transmission and distribution companies are leaders in the natural gas industry. Why? Because they are implementing voluntary, cost-effective measures to reduce emissions of methane, a greenhouse gas. They're maximizing profits by reducing gas losses, and they're demonstrating that environmental performance and business innovation go hand in hand.

To learn how your company can master this winning combination, call EPA's Natural Gas STAR Program at 202-564-2318.



EPA Natural Gas STAR Program — www.epa.gov/gasstar

Profitability & environmental performance.

As these companies know... good fit. Production Partners Amerada Hess, U.S. Exploration and Production ATOFINA Petrochemicals Belco Energy RP

Burlington Resources Chevron, U.S.A. Production **Devon Energy** ExxonMobil Production Kerr-McGee Marathon Oil Maranion Mitchell Energy Ocean Energy Phillips Petroleum, Americas Division Pioneer Natural Resources USA Shell Exploration and Production Spirit Energy 76, A Business Unit of Unocal Texaco Exploration and Production

The Stranded Gas Association Union Pacific Resources Groun Transmission and Distribution Partners **ANR Pipeline** Atlanta Gas Light Atmos Energy Baltimore Gas and Electric **Bay State Gas** Central Hudson Gas & Electric Citizens Gas & **Coke Utility** Colorado Interstate Gas Columbia Energy Group Distribution (Columbia Gas of KY, MD, OH, PA, VA) **Columbia Gas** Transmission Columbia Gulf Transmission **Conectiv Power Delivery Consolidated Edison** of New York **Consumers Energy**

El Paso Natural Gas Enron Gas Pipeline Group Equitable Resources Granite State Gas Transmission Great Lakes Gas Transmission Iroquois Gas Transmission Kansas Pipeline **Operating Company KeySpan Energy Delivery** KN Interstate Pipeline (Midcon) **Koch Gateway Pipeline** Louisville Gas & Electric Michigan Consolidated Gas New York State Electric & Gas Niagara Mohawk Power Northern Indiana Public Service Northern Natural Gas Northern Utilities NW Natural Orange and Rockland Utilities Pacific Gas and Electric

PECO Energy PSNC Energy Public Service Electric and Gas **Questar Pipeline Reliant Energy** Minnegasco Rochester Gas & Electric South Carolina Electric & Gas Southern California Gas Southern Natural Gas Southwest Gas Superior Water, Light and Power **Tennessee Gas Pipeline** Transwestern Pipeline **UGI** Utilities UtiliCorp United Washington Gas Williams Gas Pipeline -South Central Williams Gas Pipeline Transco Williston Basin Interstate Pipeline Wisconsin Public Service

This public service announcement and editorial promoting Gas STAR was printed pro bono on the cover wrap of the November/ December 2000 edition of the *Harvard Business Review.*



These natural gas companies are focused on being smart, efficient, and innovative, which are qualities that define business leadership.

Each has found that implementing market-based solutions to environmental challenges is consistent with objectives for continued competitiveness.

These forward-thinking companies are committed to improving the environment by voluntarily reducing emissions of methane, a major component of natural gas and an important greenhouse gas. As partners with EPA in the Natural Gas STAR Program, they are actively identifying and implementing cost-effective technologies and practices that reduce methane emissions, while improving the bottom line.

In teaming with EPA, these companies are establishing a reputation for reducing natural gas losses at a time when the demand for clean-burning natural gas is expected to rise significantly over the next 20 years. And EPA considers the voluntary actions of these companies an important part of the nation's response to concerns about global climate change.

To learn more about how these companies have become industry leaders while emphasizing environmental performance, call the program manager at 202-564-2318 or visit the program Web site at www.epa.gov/gasstar.

EPA Natural Gas STAR Program — www.epa.gov/gasstar

Endorsers of the Natural Gas STAR Program include:







Interstate Natural Gas Association of America





GAS STAR

Industry journals are increasingly interested in the achievements of Natural Gas STAR and its partners. These three excerpted articles highlight Gas STAR's recent accomplishments.

Methane Cuts Save STAR Partners \$54 Million

Washington, Dec. 22, 2000 - EPA's Natural Gas STAR program industrial partners reduced methane emissions from unit operations and equipment leaks by 27 billion cubic feet in 1999, according to an Agency report just released. At a gas value of \$2 per thousand cubic feet, these gas savings are worth approximately \$54 million. The STAR program, a voluntary partnership between EPA and the natural gas industry, focused on identifying and implementing cost-effective technologies and



From OGJ Newsletter

EPA is expanding its STAR program to promote cost-effective management practices that could save up to 2.5 bcf, or more than 70% of the natural gas lost annually by the gathering and processing segment of the industry. The new program proposes to reduce gas losses through market-based activities that are profitable for industry partners and beneficial to the environment. Industry partners would choose among a number of best management practices recommended by EPA to minimize equipment leaks, reduce gas releases from unit

-Oil and Gas Journal, December 11, 2000

STAR Honors Companies For Reducing Emissions

Washington - The U.S. Environmental Protection Agency announces that the industry partners in its Natural Gas STAR program reduced methane emissions from unit operations and equipment leaks by 27 billion cubic feet in 1999. At a gas value of \$2 an Mcf, these reductions equate to \$54 million, EPA notes.

EPA reports that it has awarded Kerr-McGee Oil and Gas Corp., Columbia Transmission, and Bay State Gas Co. with STAR Partner of the Year awards for outstanding performance in identifying and implementing innovative emission-reducing practices, achieving significant reductions, and supporting



-The American Oil & Gas Reporter, December 2000

PROGRAM UPDATE

Natural Gas STAR Welcomes Five New Partners!

Murphy Exploration and Production Company, a business unit of Murphy Oil Corporation, is an independent oil and gas company based in New Orleans, Louisiana. Murphy's U.S. exploration and production operations are concentrated in the Gulf of Mexico Region and onshore South Louisiana.

Average daily production from these areas in 2000 was approximately 150 million cubic feet of natural gas and 6,800 barrels of crude oil and natural gas liquids. This is roughly one-third of Murphy's total production. Visit Murphy's Web site at www.murphyoilcorp.com.

BARRETT RESOURCES CORPORATION Peru. Barrett Resources operates a gas marketing and trading group, allowing the company to market its own gas and buy and resell other companies' natural gas at a profit. Visit Barrett's Web site at www.brr.com.





Reliant Energy Arkla, based in Little Rock, Arkansas, and **Reliant Energy Entex**, based in Houston, Texas, are subsidiaries of Houston-based Reliant Energy. Together, they serve over 2.1 million natural gas customers in Louisiana and Texas. Reliant Energy is an international energy services and energy delivery company with approximately \$29 billion in annual revenue and assets totaling more than \$32 billion. The company has nearly 24,000 megawatts of power generation

in operation in the United States and nearly 4 million American customers. Visit Reliant's Web site at www.reliantenergy.com.

LouisDreyfusNaturalGas Louis Dreyfus Natural Gas

Corporation is an independent oil and gas producer based in Oklahoma City, Oklahoma. Louis Dreyfus is one of the largest natural gas companies in the United States, with reserves of 1.464 Tcfe and average daily production of 345 Mmcfe. Natural gas represents 88 percent of proven reserves. The company's major operating regions are the Mid-Continent, Permian Basin, and Gulf Coast/Offshore. Visit Louis Dreyfus's Web site at www.ldng.com. How do you like receiving the Partner Update via e-mail? Natural Gas STAR would like your opinion. E-mail your response to Carolyn Henderson at henderson.carolyn@epa.gov.

If you prefer to receive a paper copy, please let us know.

We are pleased to welcome Kathleen Meier as the newest Natural Gas STAR team member. Kathleen recently worked in the EPA Office of Pesticide Programs and will now work with Paul Gunning and Carrie Henderson to manage Natural Gas STAR. Jon Passe has moved on to another position within EPA's Climate Protection Partnerships Division.



PROGRAM TOOLS

United States Environmental Protection Agency Air and Radiatior 6202J EPA 430-F-000-013 October 2000

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Natural Gas STAR Communications Toolkit User's Guide

www.epa.gov/gasstar/toolkit



EPA

🛓 Announcing Your Partnership



Gaining Support

Publicizing Achievements



designed to help partners communicate about their participation in the program. The kit contains (1) templates

- for press releases, newsletters and web sites; (2) sample communication pieces developed and used by STAR
- partners; (3) presentations, videos, and articles about the STAR Program; and (4) technical and programmatic
- information. You can request a User's Guide from Kathleen Meier at (202) 564-9748 or go to the Toolkit on
- the Internet at www.epa.gov/gasstar/toolkit.

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TECHNICAL NEWS

Mitigating Greenhouse Gases: State of New Jersey First To Implement Action Plan



With the unveiling of its Sustainable State Project on April 17, 2000, New Jersey became the

first state to establish a goal for greenhouse gas (GHG) reductions with specific milestones. Last year, the New Jersey Department of Environmental Protection (NJDEP) committed to cutting state GHG emissions by 3.5 percent below 1990 levels by 2005. The plan calls for reducing emissions by about 20 million tons through five initiatives: energy conservation, pollution prevention, innovative technologies, recycling and solid waste management, and natural resource protection. New Jersey produces about 2 percent of the nation's greenhouse gases (about 130 million tons a year). If no action is taken, emissions are projected to rise 6 percent annually.

On February 12, all 56 New Jersey colleges and universities agreed to implement programs to help reach the state's 3.5-percent GHG reduction target. State Environmental Protection Commissioner Bob Shinn is now working to develop environmental partnership agreements with cities and counties that contain a similar commitment to GHG reductions. The City of Bayonne and Hudson County have already signed on; three more agreements are in draft stages. Joe Genovay, Office of the Commissioner, notes that Shinn plans to create a statewide program through these agreements.

Strategies to address greenhouse gases include the following:

- Establishing incentives that encourage voluntary reductions, such as a banking and trading system for carbon dioxide emissions
- Promoting energy efficiency through the Open Market Emission Trading Program and requiring power suppliers in the forthcoming deregulated electricity market to disclose energy efficiency information
- Addressing mobile sources of carbon dioxide emissions
- Reducing landfill methane
 emissions
- Promoting and establishing incentives for the use of renewable energy technologies, including geothermal, fuel cells, wave, solar, methane from landfills, biofuels and biomass used in the transportation, heating/cooling and energy production sectors

The state's action plan follows on the heels of an incentive program for permit applicants established by NJDEP. The program seeks to reduce GHG emissions and achieve higher levels of pollution prevention. The Silver and Gold Track Programs for Environmental Excellence offer regulatory flexibility to companies with superior track records in exchange for a covenant committing to specified environmental gains. Five applicants have signed up for these programs since they were announced in late 1999.

- Natural Gas STAR strives to keep
- Partners informed about greenhouse
- gas and climate change-related
- developments at the state and
- federal levels.

For more information on New Jersey's greenhouse gas action plan, contact Mike Winka, NJDEP, at (609) 292-9962. For more information on the partnership agreements, contact Joe Genovay, Office of the

Commissioner, at (609) 633-1238.



SERVICE REPRESENTATIVES

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Looking for assistance using the new Gas STAR Communications Toolkit or help in preparing your annual report? If so, your STAR Service Representative is waiting to hear from you. These representatives can help complete program forms, facilitate information exchange among partners, and provide up-to-date information on program developments.

David Frank 703/841-0588 or dfrank@erg.com Rebecca Ferro 703/841-1705 or rferro@erg.com

Thomas Graham 703/841-4378 or tgraham@erg.com

Company Name

Amerada Hess Corporation, U.S. Exploration & Production ANR Pipeline Company Atlanta Gas Light Company Atmos Energy Corporation Baltimore Gas and Electric Co. Barrett Resources Corp. Bay State Gas Company Belco Energy Corp. BP Amoco Corp. Burlington Resources, Inc. Central Hudson Gas & Electric Corporation Chevron U.S.A. Production Company Citizens Gas and Coke Utility Colorado Interstate Gas Company Columbia Energy Group **Distribution Companies** Columbia Transmission Segment **Conectiv Power Delivery** Conoco, Inc. Consolidated Edison Company of New York, Inc.

Trevor Quinn 703/841-4816 or tquinn@erg.com Jocelyn Spielman 703/841-0557 or jspielma@erg.com Heather Wright 703/841-0547 or

hwright@erg.com

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STAR Service Representative

JOCELYN SPIELMAN HEATHER WRIGHT THOMAS GRAHAM TREVOR QUINN HEATHER WRIGHT HEATHER WRIGHT JOCELYN SPIELMAN DAVID FRANK

DAVID FRANK JOCELYN SPIELMAN THOMAS GRAHAM HEATHER WRIGHT Consumers Energy **Devon Energy Corporation** Duke Energy Gas Transmission Dynegy Midstream Services, L.P. **El Paso Field Services** El Paso Natural Gas Company Enron Gas Pipeline Group Equitable Resources, Inc. ExxonMobil Corporation FINA Oil and Chemical Company Great Lakes Gas Transmission Company Iroquois Gas Transmission System Kansas Pipeline Company Kerr-McGee Oil and Gas Corporation Keyspan Energy Delivery Koch Gateway Pipeline Company Louis Dreyfus Natural Gas Louisville Gas & Electric Company Marathon Oil Company Michigan Consolidated Gas Company Mitchell Energy and Development Corporation

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SERVICE REPRESENTATIVES

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The Natural Gas STAR Service Representatives are employees of Eastern Research Group, a consulting firm providing support to EPA's Natural Gas STAR Program.

DOCUMENT REQUEST FORM



Name & Title:		
Organization:		
Street Address:		Please fax to
City, State, Zip:		your STAR Service
E-Mail Address:		Representative at
Telephone #: F/	AX #:	703-841-1440
Date Requested:		or directly to the
Date Info Needed:		Natural Gas
FedEx/UPS # (if info needed asap):		STAR Program at
		202-565-6674.

PLEASE INDICATE WHICH MATERIALS YOU WOULD LIKE TO RECEIVE:

LESSONS LEARNED

- 1. Directed Inspection and Maintenance at Compressor Stations
- 2. Directed Inspection and Maintenance at Gate Stations and Surface Facilities
- 3. Options for Reducing Methane Emissions from Pneumatic Devices in the Natural Gas Industry
- 4. Installation of Flash Tank Separators
- 5. Reducing Methane Emissions from Compressor Rod Packing Systems
- 6. Reducing Emissions When Taking Compressors Off-Line
- 7. Installing Vapor Recovery Units on Crude Oil Storage Tanks
 - 8. Replacing Wet Seals with Dry Seals in Centrifugal Compressors
 - 9. Reducing the Glycol Circulation Rates in Dehydrators
 - 10. Replacing Gas-Assisted Glycol Pumps with Electric Pumps
- 11. Installing Plunger Lift Systems in Gas Wells
- 12. Using Pipeline Pump-Down Techniques To Lower Pipeline Pressure Before Maintenance

STAR IMPLEMENTATION TOOLS

OUTREACH MATERIALS

Most of these materials are available on the Internet at www.epa.gov/gasstar