

Processor Best Management Practices and Opportunities



Innovative Technologies for the Oil & Gas Industry: Product Capture, Process Optimization, and Pollution Prevention

Targa Resources and the Gas Processors Association

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epa.gov/gasstar

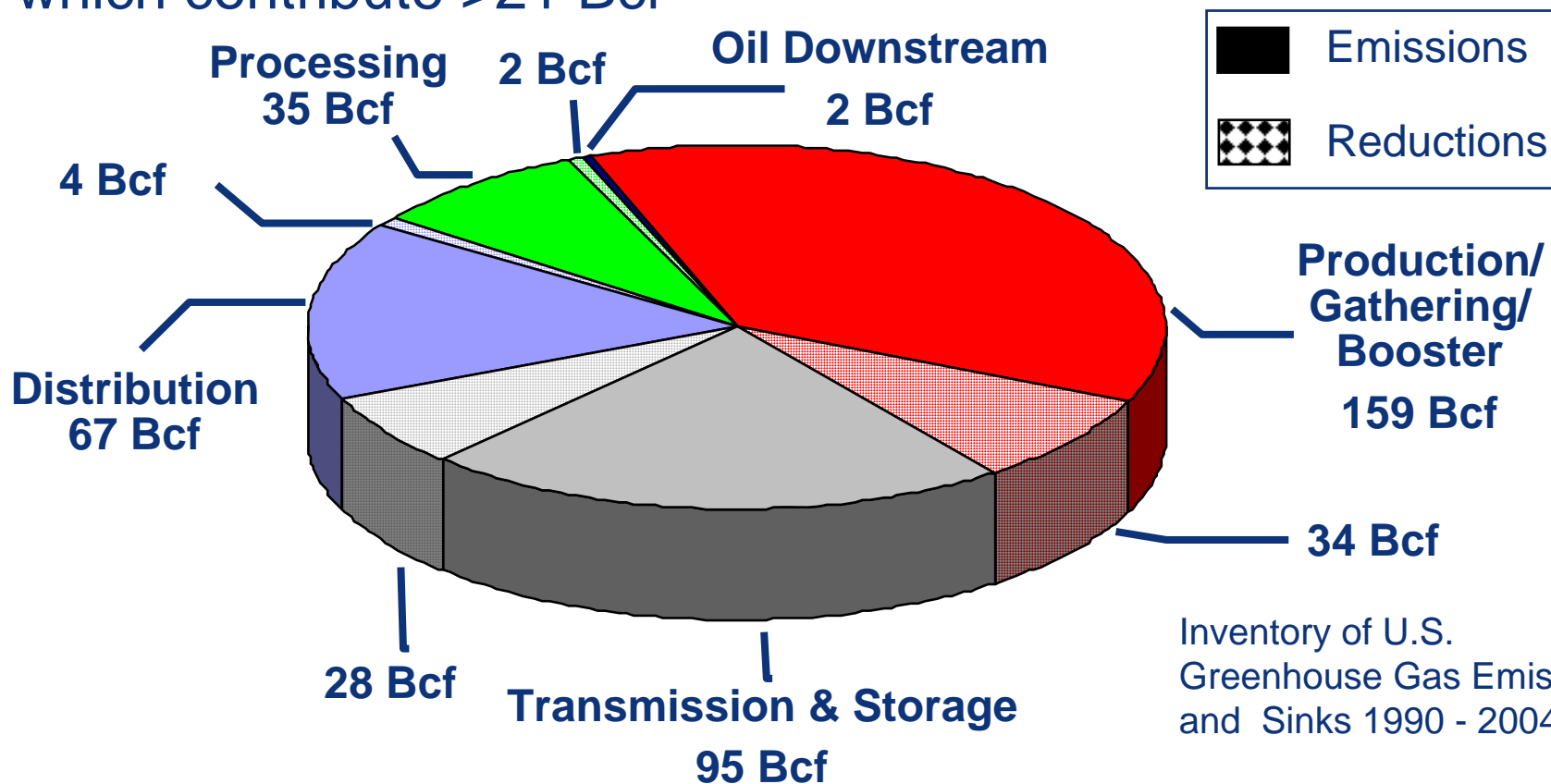


Processor Opportunities: Agenda

- 🔥 Industry Emissions
- 🔥 Recommended Technologies and Practices
- 🔥 Selected Methane Saving Opportunities
 - 🔥 Eliminate Unnecessary Equipment
 - 🔥 Composite Wrap
 - 🔥 Leak Inspection & Maintenance
- 🔥 Discussion

Natural Gas and Petroleum Industry Emissions

🔥 Processing sector responsible for 35 Bcf of methane emissions annually, not including gathering/ booster stations, which contribute >21 Bcf



Recommended Technologies and Practices

- 🔥 BMP 1: Convert Gas Pneumatic Controls to Instrument Air
 - 🔥 Gas pneumatic controls in Gathering/Booster Stations
- 🔥 BMP 2: Install Flash Tank Separators in Glycol Dehydrators
 - 🔥 Glycol regeneration vents methane
- 🔥 BMP 3: DI&M at Gas Processing Plants and Booster Stations
 - 🔥 Equipment leaks cause methane emissions



BMP 4: Partner Reported Opportunities (PROs)

🔥 Partner

- 🔥 Identified and practiced by Gas STAR partners - your peers

🔥 Reported

- 🔥 Submitted to EPA in partners' Annual Reports

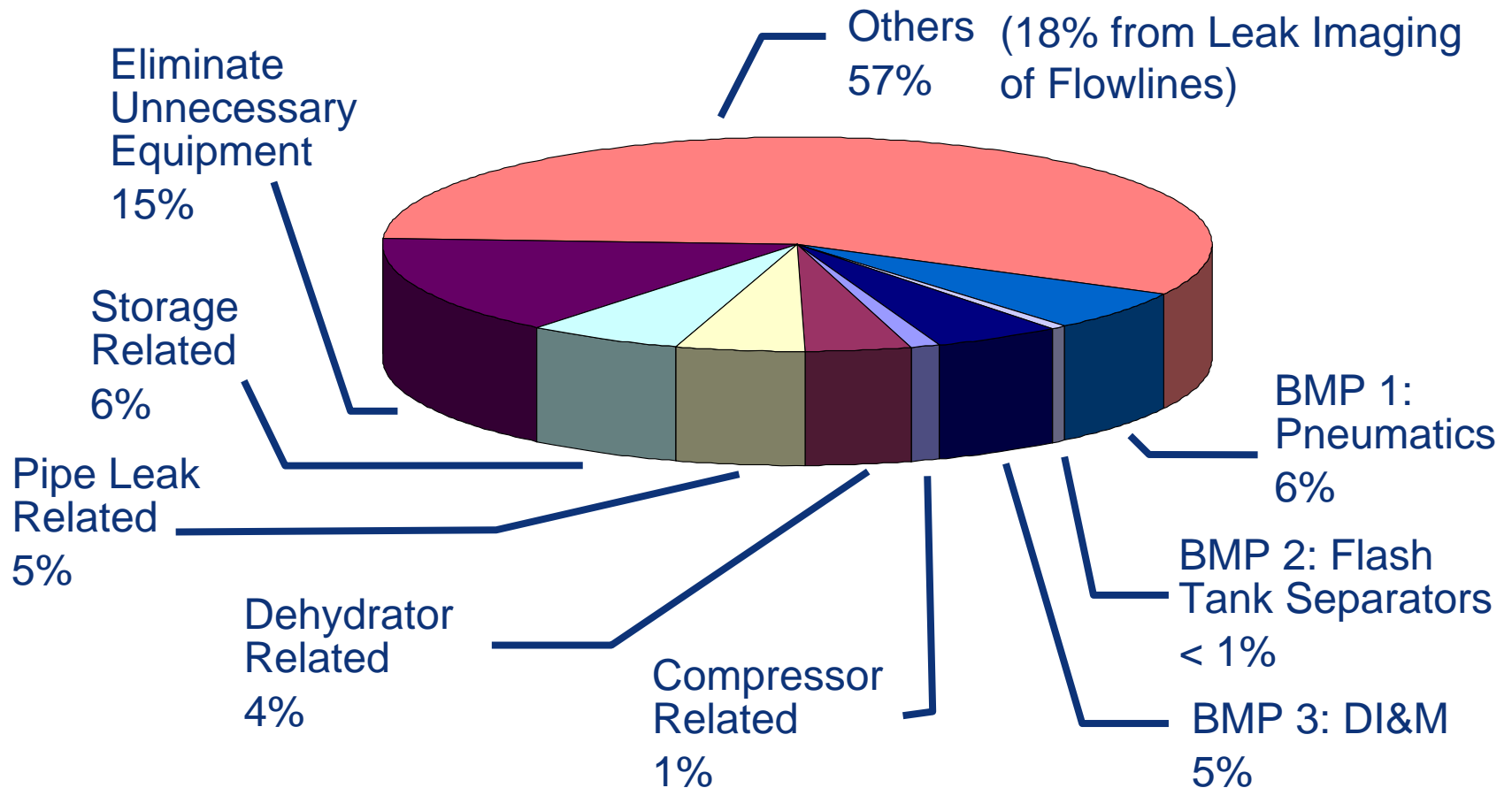
🔥 Opportunities

- 🔥 Peer-identified, cost-effective practices and technologies to reduce methane emissions



Processor BMPs

88% of the processing sector reductions came from PROs



PRO Fact Sheets

Additional valuable information

- Facilitate technology transfer
- One page
- Easy to review

29 PROs apply to Processing sector

- 17 focused on operating practices
- 12 focused on technologies

PRO Fact Sheets are derived from Annual Reports 1994-2003

- Total 63 posted PRO Fact Sheets at epa.gov/gasstar/techprac.htm



The image displays three sample PRO Fact Sheets from the Natural Gas EPA Pollution Preventer program. Each sheet is a one-page document with a blue header and white body. The first sheet is titled 'Nitrogen Rejection Unit Optimization' and includes sections for 'Applicable sectors', 'Description', and 'Operating Requirements'. The second sheet is 'Zero Emissions Dehydrators', featuring 'Applicable sectors', 'Description', and 'Operating Requirements'. The third sheet is 'Convert Engine Starting to Nitrogen', which includes 'Applicable sectors', 'Description', 'Operating Requirements', and a 'Methane Savings' section with a table of costs and payback periods. The 'Methane Savings' table shows a range of costs from \$1,000 to \$10,000 and payback periods from 1-4 years to 5-10 years. A note states that making methane emissions a primary justification for the project.

Overview of PROs

🔥 Sample of Processing PROs

- 🔥 Begin DI&M at Remote Facilities
- 🔥 Convert Engine Starting to Nitrogen
- 🔥 Convert Pneumatics To Mechanical Controls
- 🔥 Eliminate Unnecessary Equipment and/or Systems
- 🔥 Install Electric Starters
- 🔥 Pipe Glycol Dehydrator to VRU
- 🔥 Recycle Line Recovers Gas During Condensate Loading
- 🔥 Replace Ignition – Reduce False Starts
- 🔥 Use Inert Gases & Pigs to Perform Pipeline Purges
- 🔥 Use of Composite Wrap Repair

Operating Practice PROs

- 🔥 Eliminate unnecessary equipment and/or systems
- 🔥 Rerouting of glycol skimmer gas
- 🔥 Pipe glycol dehydrator to vapor recovery unit
- 🔥 Inspect and repair compressor station blowdown valves
- 🔥 Begin DI&M at remote facilities

Eliminate Unnecessary Equipment and/or Systems

What is the problem?

- As operating parameters change over time, partners have found that certain pieces of equipment initially crucial to operations have become superfluous

Partner solution

- Take unnecessary equipment out of service

Methane savings

- Based on removal of 10 separators and 3 glycol dehydrators

Applicability

- Applies to all facilities that are operating well below design levels

Methane Savings

5 to 130,000 Mcf/yr

Project Economics

Project Cost	< \$1,000
Annual O&M Costs	< \$100
Payback	< 1 yr

Eliminate Unnecessary Equipment and/or Systems

🔥 ExxonMobil

- 🔥 Replaced a 930 horsepower (Hp) compressor with 465 Hp at its Fresh Water Bayou facility in southern Vermilion Parish, Louisiana
 - 🔥 Total project cost = \$30,000
 - 🔥 Emissions reductions = 1,556 Mcf/yr
 - 🔥 Value Savings: $\$7/\text{Mcf} \times 1,556 \text{ Mcf} = \$10,892/\text{yr}$
- 🔥 Took two satellite tanks out of service and began pumping directly to the tank battery
 - 🔥 Total project cost = \$120,000
 - 🔥 Emissions reductions = 15,735 Mcf/yr
 - 🔥 Value Savings: $\$7/\text{Mcf} \times 15,735 \text{ Mcf} = \$110,145/\text{yr}$

Technology PROs

- 🔥 Use of composite wrap repair
- 🔥 Install pressurized storage of condensate
- 🔥 Aerial imaging of flowlines to identify leaks
- 🔥 Recycle line recovers gas during condensate loading
- 🔥 Convert gas-driven chemical pumps to instrument air

Use of Composite Wrap Repair

What is the problem?

- Pipeline is shutdown and vented to cut and weld pipe segment in damaged areas

Partner solution

- Use composite wrap, which consists of a filler material, a thin composite wrap and a special adhesive

Methane savings

- Based on repair frequencies between 2 - 65 times per year

Applicability

- Suitable for non-leaking defects on straight sections with up to 80% wall loss and no internal corrosion

Methane Savings

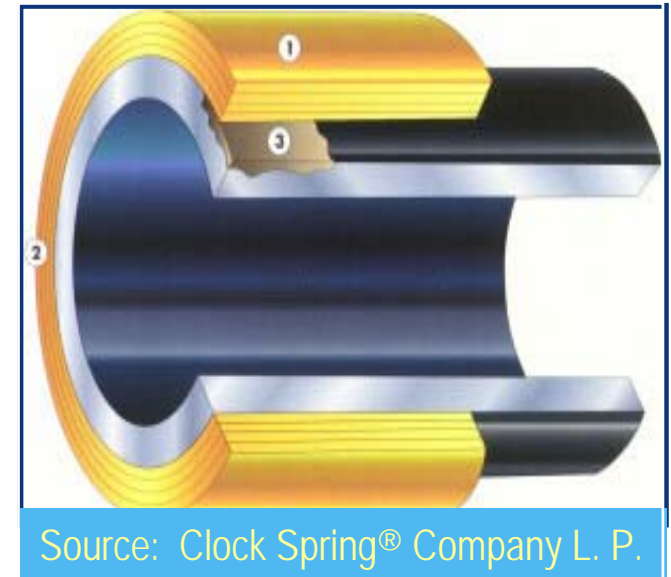
5,400 Mcf/yr

Project Economics

Project Cost	> \$10,000
Annual O&M Costs	< \$100
Payback	Immediate

Use of Composite Wrap Repair

- 🔥 Repairing non-leaking pipeline damage with composite wrap sleeves, such as Clock Spring®
 - 🔥 Eliminates venting emissions
 - 🔥 Inexpensive
 - 🔥 Can repair while operating
- 🔥 Non-leaking pipeline defects
 - 🔥 External Corrosion
 - 🔥 Dents
 - 🔥 Gouges



New PROs

- 🔥 Broad dissemination of PROs is key to program success and effective peer-based technology transfer
 - 🔥 Zero Emission Dehydrators
 - 🔥 Recover Gas from Pipeline Pigging Operations
 - 🔥 Nitrogen Rejection Unit Optimization

Aerial Imaging of Flowlines

What is the problem?

- Pipelines and flowlines into processing plant contain leaks that go unnoticed and undetected resulting in methane losses

Partner solution

- Aerial Imaging of flowlines using aircraft to cover large areas at one time

Methane savings

- Based on a one time survey of flowlines and the repair that resulting from the detection of leaks

Applicability

- Applies to all facilities with flowlines that are visible from the air

Methane Savings

5 to 1,500,000 Mcf/yr

Project Economics

Project Cost	\$1,000 - \$10,000
Annual O&M Costs	< \$100
Payback	< 1 yr

Aerial Imaging of Flowlines

🔥 Enbridge Energy Partners

- 🔥 Conducted two helicopter leak surveys in 2004 and 2005 finding leaks in flowlines and repairing them
 - 🔥 2004 Survey and repairs reduced 769,000 Mcf of methane emissions
 - 🔥 2005 Survey and repairs reduced 1,224,000 Mcf of methane emissions
 - 🔥 Total value of almost \$14 Million at \$7/Mcf

🔥 Duke Energy Field Services

- 🔥 Conducted surveys over several gathering systems
 - 🔥 2005 Survey and repairs reduced 695,000 Mcf of methane emissions
 - 🔥 Total value of almost \$5 Million at \$7/Mcf

Discussion

- 🔥 Industry experience applying these technologies and practices
- 🔥 Limitations on application of these technologies and practices
- 🔥 Actual costs and benefits