

Project Finance Opportunities for Natural Gas Emission Mitigation

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Presentation Outline



- ***Magnitude of natural gas system emissions***
- ***Natural gas system project opportunities and challenges***
- ***Where to seek methane emission reduction finance***
- ***Potential value of carbon emission reductions***
- ***Conclusions***

Magnitude of Natural Gas System Emissions



➤ 2002 US natural gas system methane emissions

- Production 2.7 billion cubic meters (bm^3)
- Processing 1.0 bm^3
- Transmission 2.8 bm^3
- Distribution 2.0 bm^3
- **Total** **8.5 bm^3**

Magnitude of Natural Gas System Emissions



➤ Global methane emissions from natural gas systems

- 44 to 88 bm^3 per year
- Methane GWP: 21 times that of carbon dioxide
- Annual carbon dioxide equivalent (CO_2e) emissions = ~628 to 1,256 million tonnes globally



Magnitude of Natural Gas System Emissions



➤ **Methane emission reduction opportunity**

- USEPA estimates that roughly 20 percent of emissions can be cost-effectively eliminated
- Therefore, ~125 to 251 million tonnes CO₂e = annual potential global emission reduction opportunity!

Magnitude of Natural Gas System Emissions



➤ Natural gas system methane emission reductions make good sense

Business: In US in 2002, natural gas companies working with USEPA Natural Gas STAR Program reduced methane emissions by $>1.5 \text{ bm}^3$ = savings of ~US\$210 million

Environmental: High global warming potential (21 times CO_2) means that methane releases contribute substantially to atmospheric greenhouse gas (GHG) loading

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Natural Gas System Project Opportunities and Challenges



- **Technological options to reduce methane emissions from natural gas systems are available, but...**
- **Increased gas sales alone may not always be adequate to offset a mitigation project's incremental cost**
- **Monetizing CO₂e emission reductions may provide an additional revenue stream adequate to improve project economics and make projects more attractive to developers and investors**

Natural Gas System Project Opportunities and Challenges



- **Fugitive GHG emissions in the natural gas industry occur in four sectors**
 - Exploration and production (E&P)
 - Processing
 - Transmission
 - Distribution

- **Opportunities to generate monetizeable CO₂e emission reductions should be available in any sector**

Natural Gas System Project Opportunities and Challenges



➤ Major emission sources in the natural gas industry

Sector	Emission Sources
E&P	High-bleed pneumatics, glycol dehydrators, well venting, flaring
Processing	High-bleed pneumatics, glycol dehydrators, venting, compressor rod packing and wet seals, flaring
Transmission	Compressor rod packing and wet seals, reciprocating engines, turbines, high-bleed pneumatics, leaky pipes
Distribution	Gate station hardware, leaky pipes and meters

Natural Gas System Project Opportunities and Challenges



- **Quantifying emission reductions at a level of detail necessary to support emission monetization can be complicated by**
 - Technology factors
 - System management issues
 - Difficulty in verifying current emissions
 - Project level
 - Corporate
 - Country wide
 - Errors in assumed emission factors
 - Difficulty in applying a rigorous bottom-up analytical approach
 - Time and cost of measurement

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Where to Seek Methane Emission Reduction Finance



- **Certain market mechanisms have derived from the United Nations Framework Convention on Climate Change, and...**
 - Allow project developers in one country to generate monetizeable emission reductions through project implementation in another country
 - Are supporting the emergence of a world market for carbon emission reductions

Where to Seek Methane Emission Reduction Finance



- **Certain finance options may be available to projects that**
 - Can prove achievement in emission reductions
 - Can demonstrate that emission reductions would not have been achieved in the absence of the project
 - Support sustainable development and natural resource (energy) conservation
 - Are environmentally sound
 - Achieve atmospheric GHG release mitigation
 - Need supplemental revenues to support an adequate return on investment
 - Offer some level of risk mitigation for investors

Where to Seek Methane Emission Reduction Finance



- **The emerging global carbon emission reduction market is defined by**
 - Market drivers
 - Market buyers
 - Market enhancers/facilitators

Where to Seek Methane Emission Reduction Finance



➤ Market drivers

- **European Union**—plans to begin trading carbon emission reductions in 2005
- **United Kingdom**—project-based GHG emissions reduction pilot launched in 2002
- **United States**—Chicago Climate Exchange (CCX) is establishing a voluntary cap-and-trade program initially in North America and Brazil
- **Other countries**—Norway, Japan, Switzerland, Canada

Where to Seek Methane Emission Reduction Finance



➤ Market buyers

- **World Bank/Prototype Carbon Fund (WB/PCF)**
provides finance support for projects that produce high-quality GHG emission reductions; PCF takes title to the resultant emission reductions
- **Natsource GHG Credit Buyers Pool**—carbon broker Natsource is establishing a US\$200-million Greenhouse Gas-Credit Aggregation Pool (GG-CAP) that will purchase GHG emission reductions from project-based actions

Where to Seek Methane Emission Reduction Finance



➤ Market buyers

- Netherlands
 - **Certified Emission Reduction Unit Procurement Tender (CERUPT)** provides project funding to purchase certified emission reductions in developing countries
 - **Emission Reduction Unit Procurement Tender (ERUPT)** purchases emission reductions in developed countries and economies in transition
 - **International Finance Corporation–Netherlands Carbon Facility (INCaF)** purchases carbon emission reductions from projects in developing countries

Where to Seek Methane Emission Reduction Finance



➤ Market enhancers/facilitators

- **Asian Development Bank Renewable Energy, Energy Efficiency, and Climate Change (REACH)** facility works cooperatively with development funds in Denmark, the Netherlands, and Canada to assist developing countries to identify, develop, and market GHG emission reduction projects
- **European Bank for Reconstruction and Development** has joined with FondElec Group and the Dexia Bank of France to create Dexia-FondElec Energy Efficiency and Emissions Reduction Fund to invest in projects in Central and Eastern Europe that improve industrial processes and mitigate climate change

Where to Seek Methane Emission Reduction Finance



➤ Market enhancers/facilitators

- **Global Environment Facility** provides cost-sharing grants and concessional funding to help developing countries fund projects that protect the environment, with climate change mitigation as one of its four focus areas
- **Carbon brokers**—Natsource, Cantor Fitzgerald/CO2e.com, and Evolution Markets LLC—serve as intermediaries to bring carbon emission reduction sellers and buyers together and to facilitate transactions

Where to Seek Methane Emission Reduction Finance



So, who shall I approach to seek financing for my methane emission mitigation project?

The answer, in part, depends on where the project is located . . .

Where to Seek Methane Emission Reduction Finance



- Possible finance sources in *developed countries*
 - Emission Reduction Unit Procurement Tender
 - Chicago Climate Exchange
 - Greenhouse Gas-Credit Aggregation Pool
 - Brokers

Where to Seek Methane Emission Reduction Finance



- Possible finance sources in *countries with economies in transition*
 - World Bank/Prototype Carbon Fund
 - Emission Reduction Unit Procurement Tender
 - Chicago Climate Exchange
 - Greenhouse Gas-Credit Aggregation Pool
 - European Bank for Reconstruction and Development
 - Brokers

Where to Seek Methane Emission Reduction Finance



➤ Possible finance sources in *developing countries*

- World Bank/Prototype Carbon Fund
- Certified Emission Reduction Unit Procurement Tender
- International Finance Corporation - Netherlands Carbon Facility
- Chicago Climate Exchange
- Greenhouse Gas-Credit Aggregation Pool
- Asia Development Bank
- Global Environment Facility
- Carbon Brokers

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Potential Value of Carbon Emission Reductions



- **More than 100 transactions reported worldwide in 2002**
- **Typical transaction volumes = 1,000,000 tonnes CO₂e**
- **Unit prices vary**

Potential Value of Carbon Emission Reductions



➤ Unit prices vary

- **ERUPT**—up to US\$8.10/tonne CO₂e (US\$115.71/thousand m³ methane)
- **PCF**—up to US\$4.10/tonne for zero-risk projects; ~US\$1.50 to \$3.50 more typical range (US\$58.57/thousand m³ methane)
- **UK**—US\$7.00 to \$9.00 range, as high as US\$18.00 reported (US\$100.00–\$128.57/ thousand m³ methane; high = US\$257.14/thousand m³ methane)
- **Denmark**—cap is US\$5.00 to \$6.00 (US\$71.43–\$85.71/ thousand m³ methane); transactions reported in the US\$2.00 to \$4.60 range (US\$28.57–\$65.71/ thousand m³ methane)

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Conclusions



- **Technological options for natural gas system emission reductions exist**
- **Projects may need supplemental revenue to be attractive to developers and investors**
- **A world market that can provide revenues in exchange for carbon emission reductions is evolving**

- **Global market with unit sales prices commonly above US\$3.00 per tonne CO₂e—a galaxy of opportunity**





- **Obtain additional information on project finance opportunities from the U.S. Environmental Protection Agency's Natural Gas STAR program:**

<http://www.epa.gov/gasstar>

and



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