

# Assessment of Motivations for Saving Methane Emissions in International Oil and Gas Operations

Oil and Gas Methane Emissions Reduction Workshop

Tomsk, Russia

14-16 September 2005



# Methane to Markets

# Agenda

- Why reduce methane emissions?
- Excess supply natural gas markets
- Potential new markets
- Profiting from reduced methane emissions
- Conclusions



# Why Reduce Methane Emissions?

- Keeping methane in the pipeline can lead to increased gas sales
- Sometimes saving methane also:
  - **Lowers capital and operating costs**
  - **Raises efficiency and reliability**
  - **Increases profits**
- The Kyoto Protocol Clean Development Mechanism (CDM) and Joint Implementation (JI) provide means to market Emission Reduction Units (ERUs)
  - **Attract investments in exchange for emission reductions for profit**



**Methane to Markets**

# Why Reduce Methane Emissions?

- The Joint Implementation mechanism affects countries like Russia, Ukraine, and Poland
- The best economic benefits will come from the trading of ERUs
- The following analysis will use Russia as the specific example



# Russian Natural Gas Industry

- As the world's largest natural gas producer, Russia has a large gas surplus
  - Meets domestic consumption of 430 billion m<sup>3</sup> per year and exports of 200 billion m<sup>3</sup> per year with large surplus
- About 50% of associated gas produced from oil wells is flared or otherwise not utilized

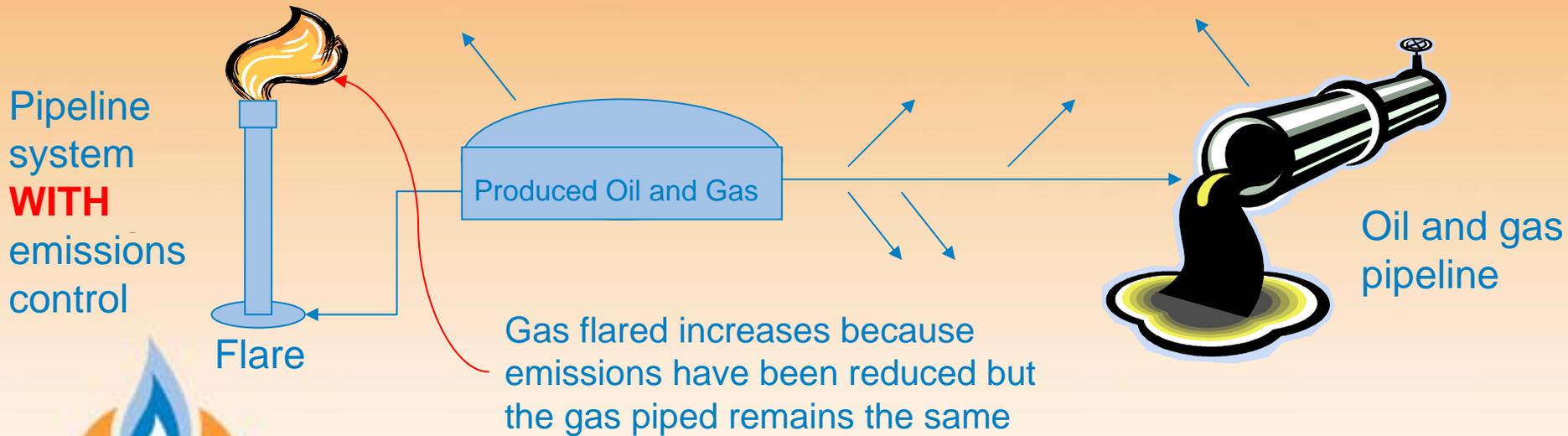
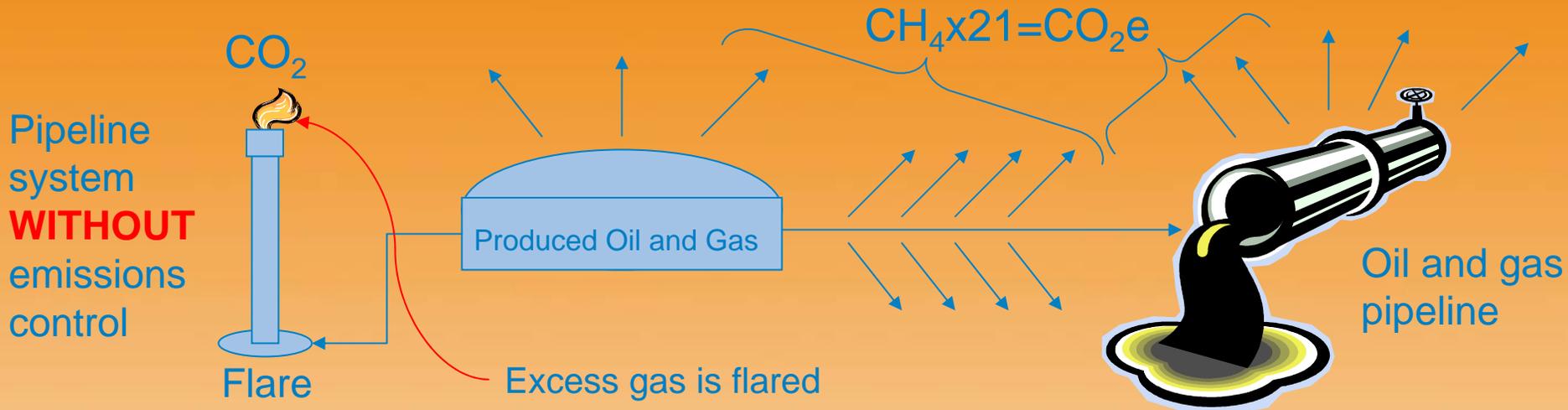


# Natural Gas Operations in an Excess Supply Market

- Russian oil and natural gas industries operate independently
  - Dedicated gas wells supply much of the natural gas market
  - Supplemental supply to natural gas pipelines comes from associated gas
  - Not all associated gas is accepted into the gas transmission pipeline
- The excess gas supply not used as fuel or brought to market is flared or vented



# Understanding Emissions Reduction



**Methane to Markets**

↗ = Methane Emissions

# Natural Gas Operations in an Excess Supply Market

- Reducing emissions from pipelines will:
  - Make gas transmission systems more efficient
  - Decrease the amount of associated gas accepted into the pipelines
- Flaring surplus associated gas is the only benefit of reducing methane emissions in an excess supply market
  - The global warming potential of CO<sub>2</sub> from flaring (1) is less than methane (21)
- Other economic benefits are needed to justify investment in a methane emissions reduction project



# Russia Emerging Markets

- Current emissions of methane from oil and gas infrastructure are estimated at 250 million tonnes of CO<sub>2</sub> equivalent
- This methane can be captured and used in new markets:
  - Expanding export capacity
  - Carbon markets
  - Electricity generation



**Methane to Markets**



Source: EIA Russia Country Analysis Brief, 2005  
<http://www.eia.doe.gov/emeu/cabs/russia.html>

# Potential New Markets: Exports

- New export opportunities for Russia can reduce methane flaring and venting
  - New pipelines to Asia
  - Expanded pipelines to Europe
  - New liquefied natural gas (LNG) export facilities
- Increased exports means increased profits



LNG Export Facility

Source: Siemens, 2005  
[http://www.industry.siemens.com/oil-gas/en/processes/og\\_proc\\_lng.htm](http://www.industry.siemens.com/oil-gas/en/processes/og_proc_lng.htm)



**Methane to Markets**

# Potential New Markets: Carbon Market

- Carbon credits can increase profits
  - Russia is seen as largest seller of greenhouse gas emission credits (ERUs) in the world
  - At ~\$30 per tonne CO<sub>2</sub> equivalent, investments in methane emissions reduction are becoming more attractive
  - Russia has registered eight Kyoto Protocol JI projects, including two fugitive gas capture projects



# Potential New Markets: Electricity Generation

- Electricity generation can utilize more gas
  - Russian industry is highly electrified
    - majority of power comes from oil, natural gas, and coal-fired power plants
    - pumps, compressors, and other equipment
  - Using flared gas for on-site electricity generation can save 20 to 30% over the cost of purchasing power from the grid



# Profiting from Reduced Methane Emissions

- New and replacement facilities can reduce methane emissions, reduce costs, and earn more profits
  - Vapor recovery units reduce gas lost from storage tanks and earn carbon credits
  - Desiccant dehydrators reduce labor and operating costs
  - Low-bleed pneumatic devices decrease gas vents and can earn carbon credits
  - Newer equipment is more reliable, requiring less operating and maintenance costs
- These methane emissions reducing technologies can:
  - Earn carbon credits
  - Reduce regulatory fees
  - Reduce operating and labor costs



**Methane to Markets**

# Conclusions

- Russia is working toward expanding markets for natural gas
  - **Increased export of gas and LNG**
  - **Increased use of gas for local electricity generation**
- Russia is viewed as the largest seller of carbon emissions credits in the world
- Russian industries can improve efficiency and reduce costs with methane emissions reduction technologies



# Contacts

Roger Fernandez

United States Environmental Protection Agency

+1-202-343-9386

[fernandez.roger@epa.gov](mailto:fernandez.roger@epa.gov)

Don Robinson

ICF Consulting

+1-703-218-2512

[drobinson@icfconsulting.com](mailto:drobinson@icfconsulting.com)



**Methane to Markets**