Greenhouse Gas Issues:
Fugitive Emissions from Pipelines

Sept 15, 2009

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Agenda

- How does TransCanada track and manage its emissions
  - Development of an Emissions Management Strategy
  - Emissions Management Practices

- Fugitive Emission Management
  - Field Practices
  - Measurement, Calculations, Estimations

- Quantifying Business Decisions
  - Drivers
  - Dependencies
Gas Pipelines
- 59,000 km wholly owned
- 7,800 km partially owned
- 250 Bcf of regulated natural gas storage capacity
- Average volume of 15 Bcf/d

Oil Pipelines
- Keystone 1.1 million Bbl/d
- Expandable to 1.5 million Bbl/d

Energy
- 19 power plants, 10,900 MW
- Diversified portfolio, primarily low-cost, base-load generation
- 120 Bcf of non-regulated natural gas storage capacity
EMS - Emissions Management System

TransCanada Emissions Management System

Combustion Emissions
- CO₂
- CH₄
- N₂O

Energy Efficiency and conservation

R & D

Vented Emissions (CH₄, CO₂)

Fugitive Emissions
- CO
- VOC’s
- NOx

LDAR (leak detection & repair)

HFS (measurement)

Blowdown Emissions
- transfer compression
- pipeline inspection tools
- buttering and hot tapping
- stopple plugs
- repair sleeves
- hot line lowering
- incineration
Fugitive Emissions

Fugitive Emissions (ktCO2E)

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Where do fugitives come from?

Sample Field Measurement Data Analysis

Cumulative Fraction of Total Leak Rate

Cumulative Fraction of Leaking Components
Methane Emissions Distribution

Greenhouse Gases

12%

Methane Emissions
Combustion emissions

88%

Methane Emissions

17%

Fugitive emissions
Blowdown emissions

83%
Key Points for Pipeline facilities in a GHG constrained world

Little scope for emission reductions:

- Combustion emission reductions from existing facilities is extremely expensive
- Existing Facility options are:
  - Pipe vs compression for new projects
  - Efficiency improvements
  - Electrification in isolated instances
  - Reduction in fugitive emissions
CEPEI

A collaboration of Canada’s major natural gas transmission and distribution companies

Mission
To provide the Canadian natural gas industry with tools and timely information to optimize environmental performance and promote natural gas as the fuel of choice
CEPEI Members and Co-Funders

Alliance Pipelines
ATCO Gas
AltaGas Utilities Inc.
ATCO Pipe Lines
Duke Energy Gas Transmission Canada
Enbridge Gas Distribution
Gaz Metro, Inc.
Manitoba Hydro
SaskEnergy
Incorporated/TransGas Limited
Terasen Gas
TransCanada Corporation
Union Gas

External Project Co-Funders (e.g., ATCO Power, Environment Canada, Guelph Hydro Electric Systems, INGAA, Northland Power, Ontario Power Generation, Town of Markham, etc.)
Climate Change Program Area – The History

Over 30 projects – a shared investment of over $2.5 million Cdn.

Measurement protocols and studies;
An industry handbook and other tools (e.g., GHG Calc Canadian version);
Emission/activity factor improvement studies;
Uncertainty analyses; and
Audit
Fugitive Emissions Best Management Practices

- The pipeline industry feels they are proactively managing these emissions in a manner that works.

- Development of a guidance document that communicates
  - differences in fugitive sources between transmission and distribution systems
  - allows individual companies and facilities to develop customized approaches based on risk and asset management practices
  - will include a decision tree and rationale for targeting fugitive emissions.
Pipeline Options for GHG Reductions

- Physical
  - Efficiency upgrades (limited)
  - Replace drivers with electric motors
  - Replace compression with pipe
  - Reduce throughput/output
  - Waste Heat recovery/cogeneration
  - Capital stock turnover
  - Carbon Capture & Sequestration

- Contractual
  - Purchase GHG credits/offsets/allocation
  - Invest in “technology”
Reducing GHGs from Fossil Fuel Use

Do you understand the scale?

- To displace about 40% of today’s energy consumed in the form of fossil fuels would require:

  6,700 nuclear plants
  3,096,000 large wind turbines
  4,954,500,000 solar roof tops (there aren’t that many roofs)
  220 Three Gorges Dams