



TransCanada Case Study: Emissions Management System

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TransCanada
In business to deliver

Agenda



- How does TransCanada track and manage its emissions?
 - Development of an Emissions Management Strategy
 - Creation of an Air Emissions Database
 - Emissions Management Practices
 - Continual Investment in R&D

- Quantifying Business Decisions
 - The Implementation of effective Practices and Procedures

TransCanada



- Leading North American company in natural gas transmission and power generation
- \$25.9 Billion in pipe and power assets (\$Cdn at December 31, 2006)
- 2007 named as a member of the *Global 100 Most Sustainable Companies* in the world
- Skilled, expert, energetic people with strong technical knowledge
- Strong financial position to capture opportunities going into the future

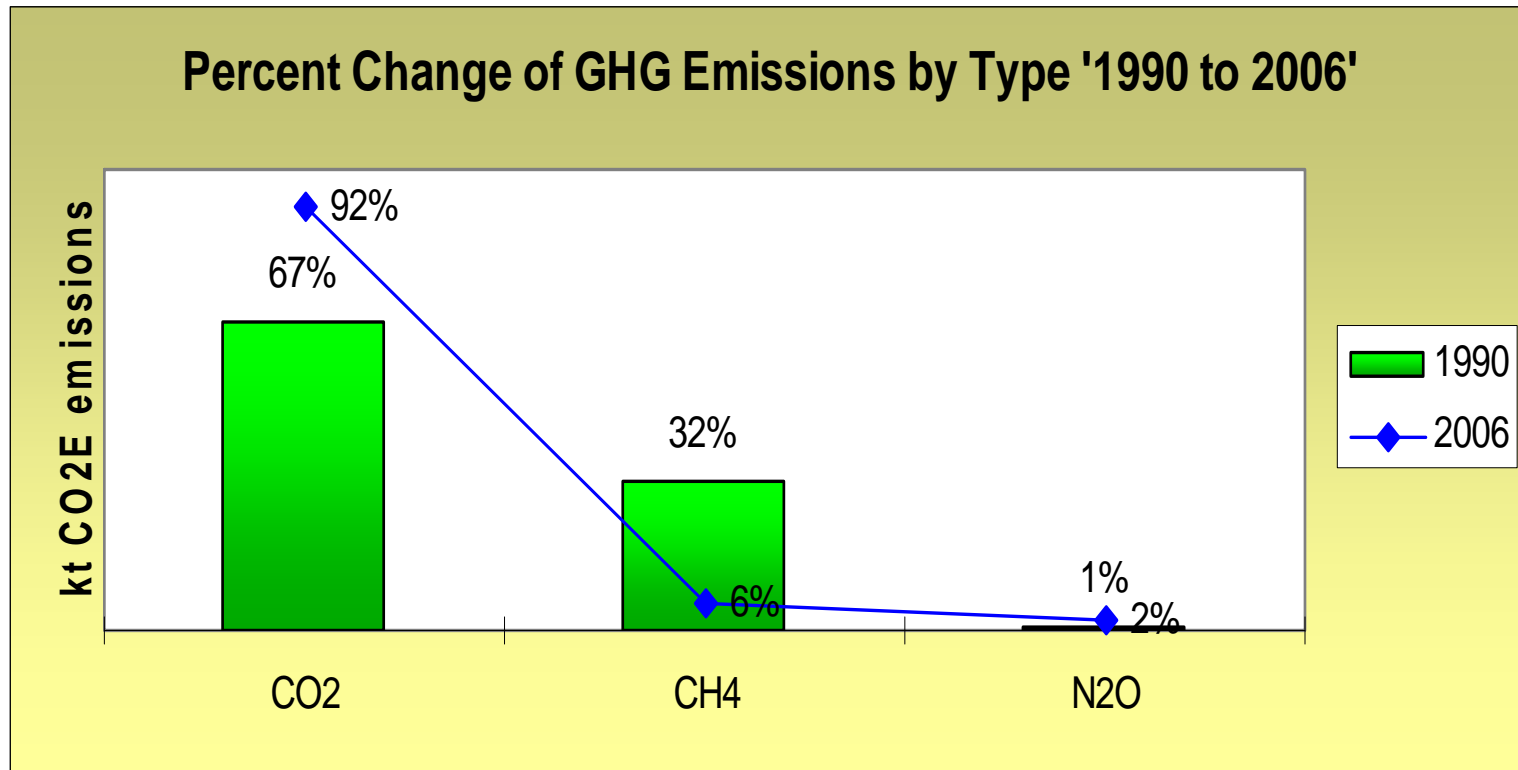


Quality assets and proposed projects



- approx. 59,000 km (36,500 miles) of wholly owned pipeline
 - transports 15 billion cubic feet/day (Bcf/d) from virtually all major supply basins on the continent
- 2,969 km of proposed oil pipeline, capable of transporting 435,000 barrels per day
- 16 power facilities with 7,700 megawatts of power generation
- two proposed liquefied natural gas facilities
 - 1.5 Bcf/d

TransCanada Emission's Profile

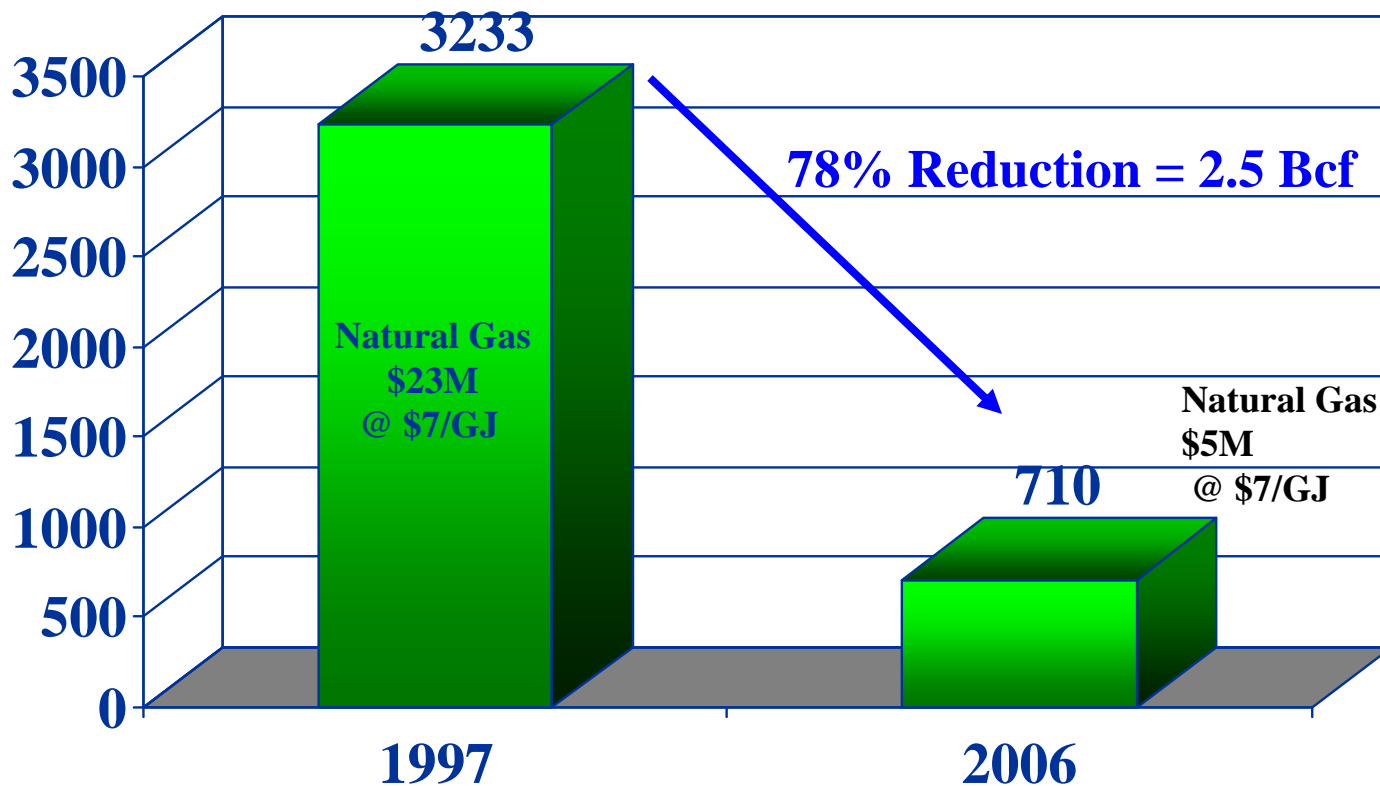


- Decrease in methane emissions is due to effective leak detection and repair program (LDAR).

Methane (Fugitive) Emissions Management: *Program Successes*



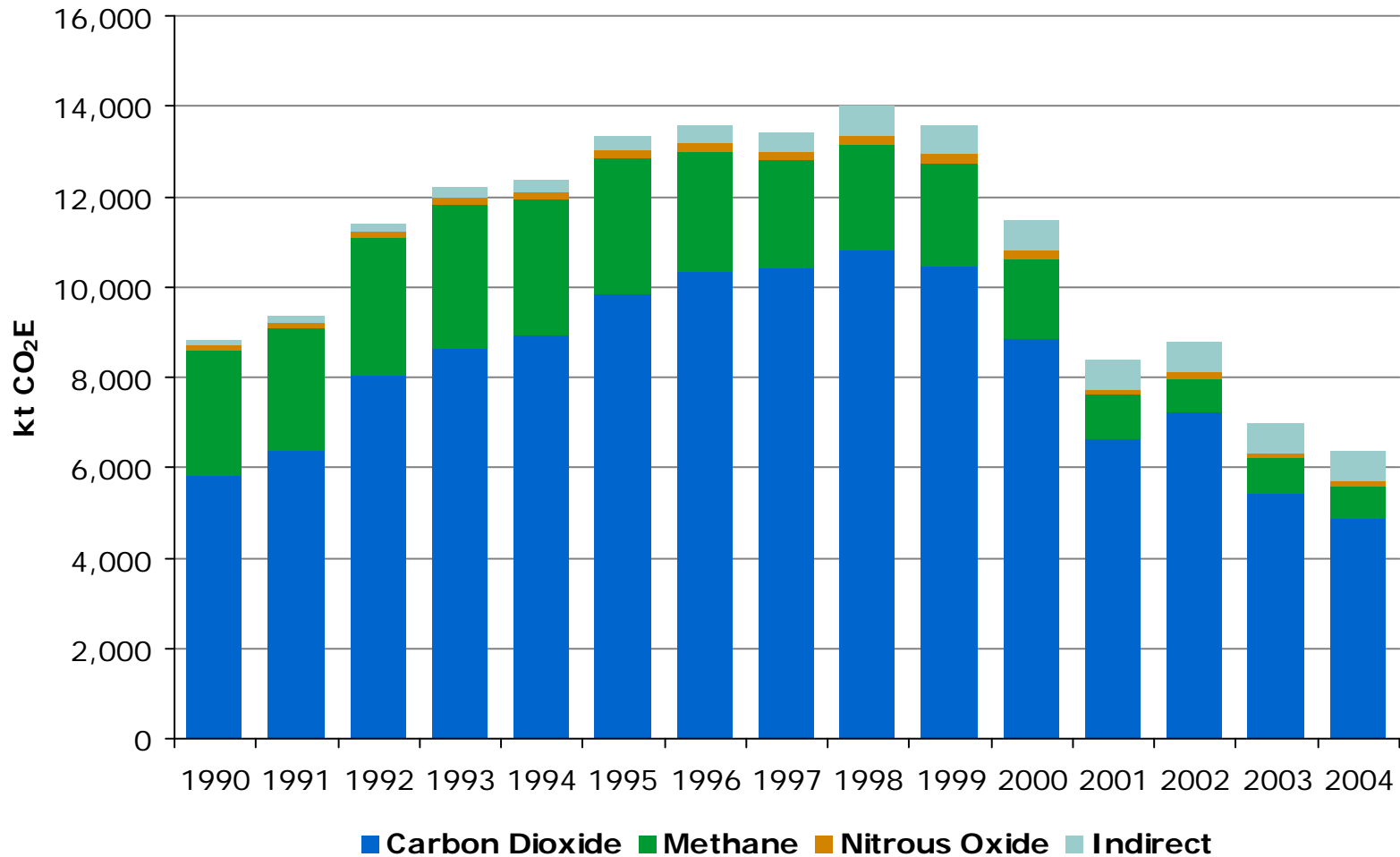
Fugitive Emissions in million ft³ CH₄



*TransCanada's Fugitive Emissions Management
Program is Recipient of 2006 CCME Award*



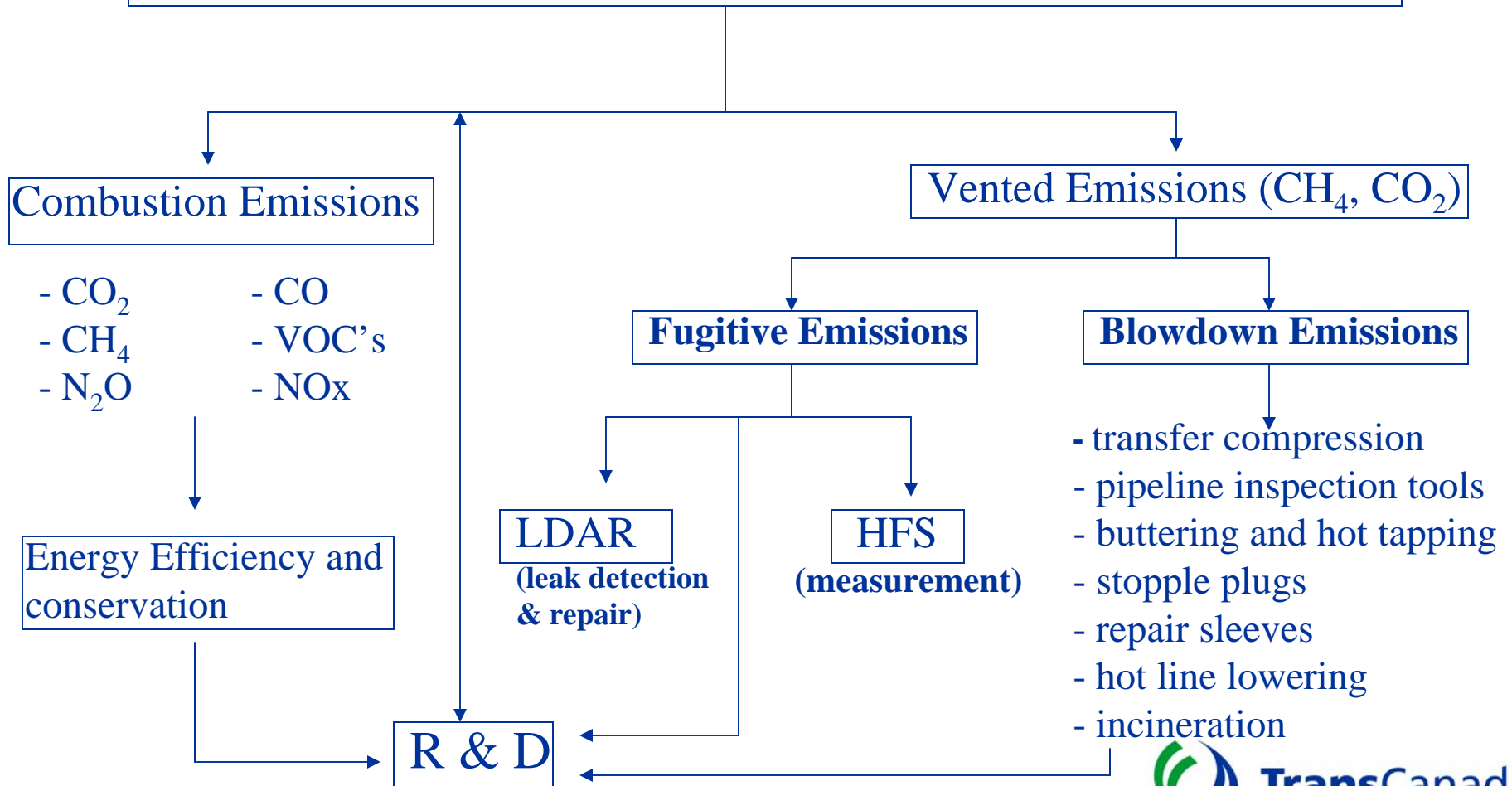
GHG emissions from pipeline operations and methane reduction



EMS - Emissions Management System



TransCanada Emissions Management System



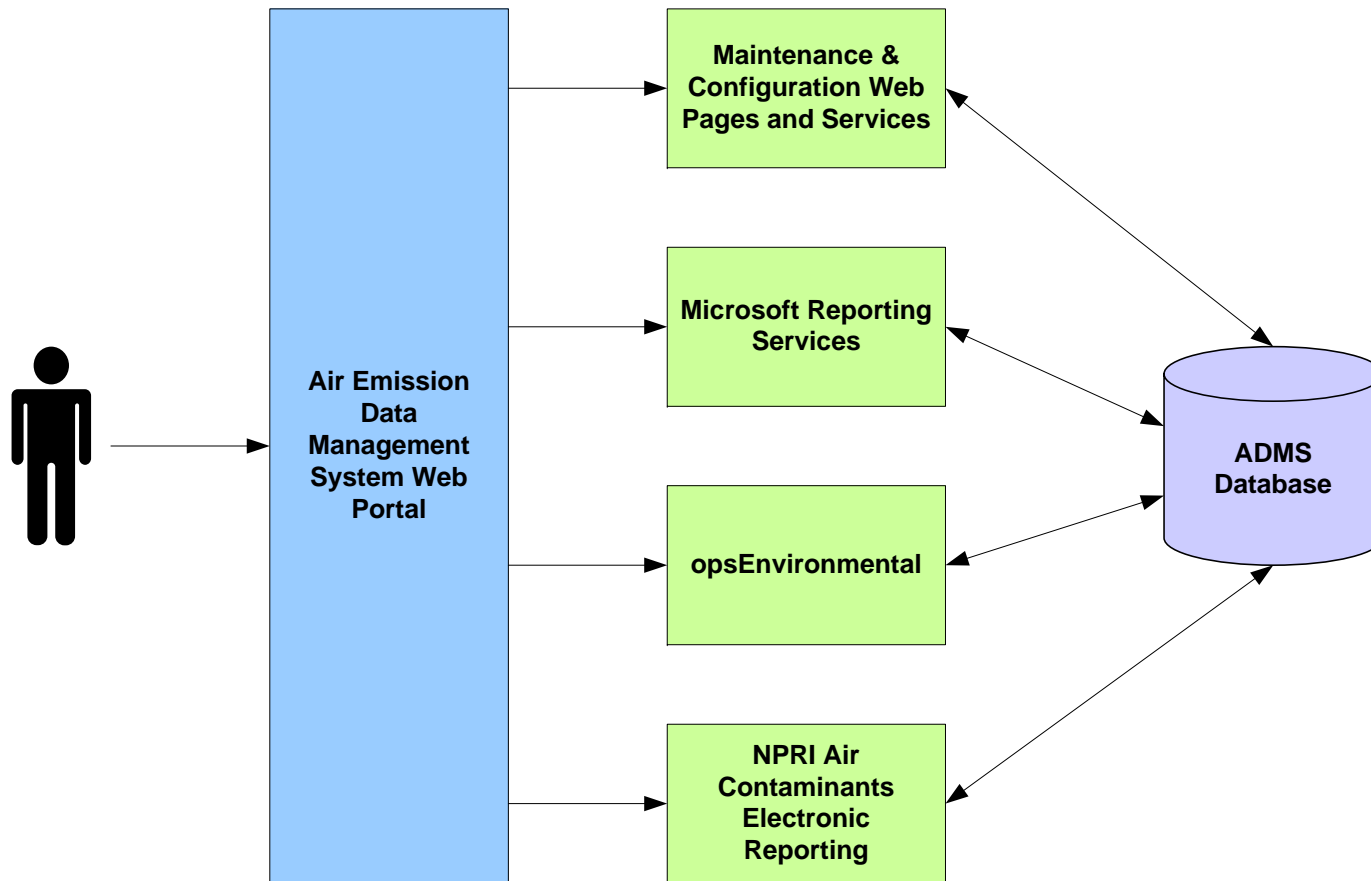
Air Emissions Database System



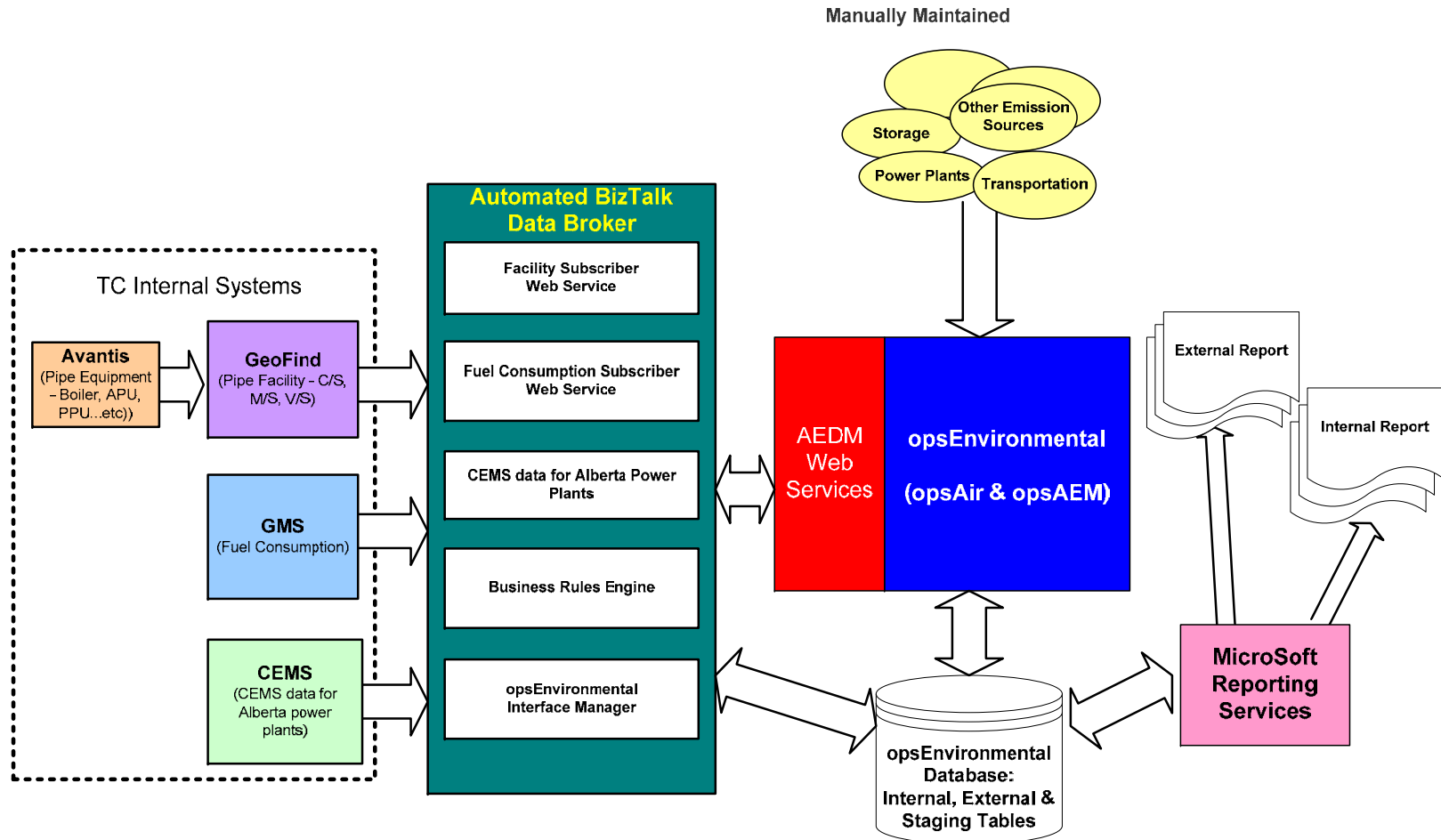
Allows TransCanada to:

- Develop confidence in handling complex issues
- Effectively and Efficiently manage incoming emissions data
- Retrieve and Store information easily
- Reduce wait times for data
- Assumptions made can be stated and defended clearly

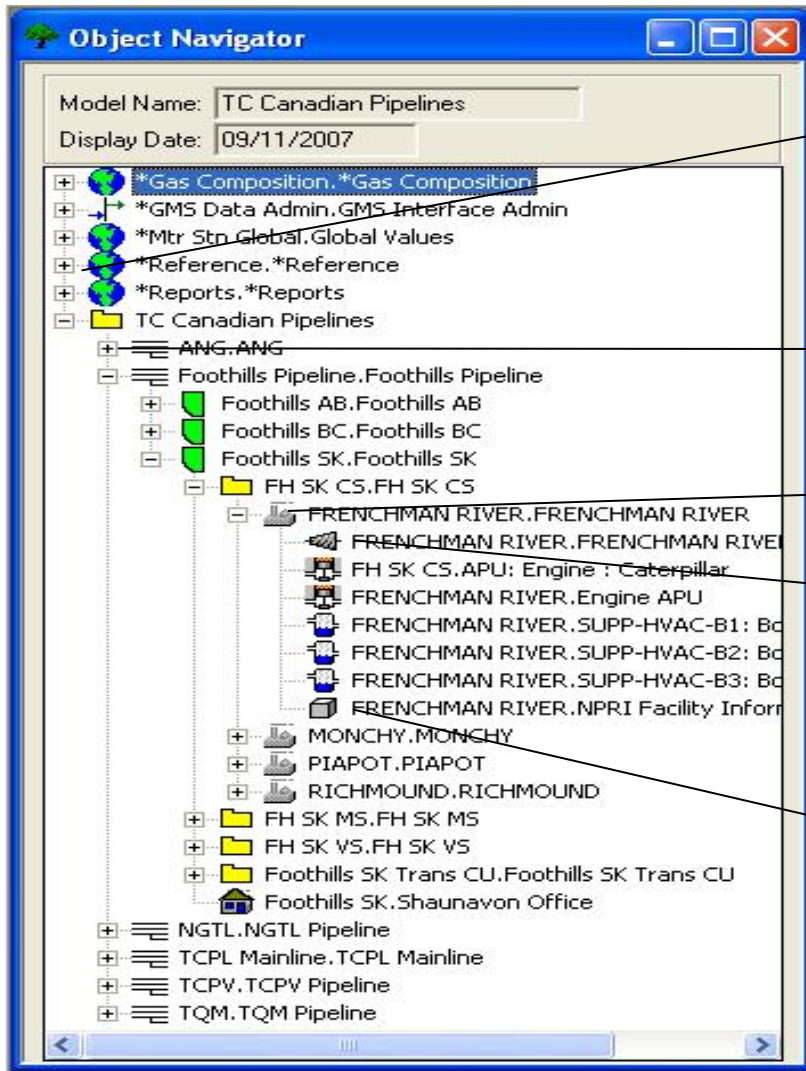
Air Emission Data Management System User Experience



Air Emission Data Management System Logical Design and Interfaces



Air Emission Data Management System opsE Pipeline Hierarchy



Global libraries, such as *Reference and *Reports are included in all facility models.

This is a pipeline system.

This is a compressor station.

This is a compressor unit.

This is the NPRI Facility Information for Frenchman River compressor station.



- Interfaces
 - Facility and equipment master data
 - Fuel consumption and measured emission data
- Rollup Models
 - Facility models (i.e. compressor stations and power plants) are rolled up to operating regions and province/state rollup models
 - Corporate reporting level rollup models

opsEnvironmental Design cont'd



- Classes
 - Physical Classes
 - Compressor station, compressor unit, APU, PPU, boiler...
 - Logical Classes
 - Folder, group, gas composition, NPRI Facility Information...
- Objects
 - Attributes of the physical object
 - Ex. fuel consumption, address, operating region
 - Calculations for the physical object
 - Ex. CO2 emission, NOx emission

Emissions Management Team



A group of experienced people from many departments of the company that regularly reviews progress and sets targets and goals

- Uses reports to review progress
- Efficient decisions can be made
- Information is transparent and consistent
- Assumptions are clear upfront

Blowdown Emissions Management



Control Methods and Technologies Used

- Scheduling Practices
- Operational Adjustments
- Transfer (Pull-down) Compressors
- Buttered Stubs
- Hot Tapping
- Hot Line Lowering
- Sleeves
- Stopples



Supersonic Gas Injector



- Developed for capturing very low pressure vent gases and re-injection into a high pressure gas stream without the use of rotating machinery
- Savings
 - 4 million ft³/yr of gas savings from one compressor
 - Natural gas worth \$28,000/yr/unit @\$7/GJ
 - GHG emissions
 - Zero operating cost

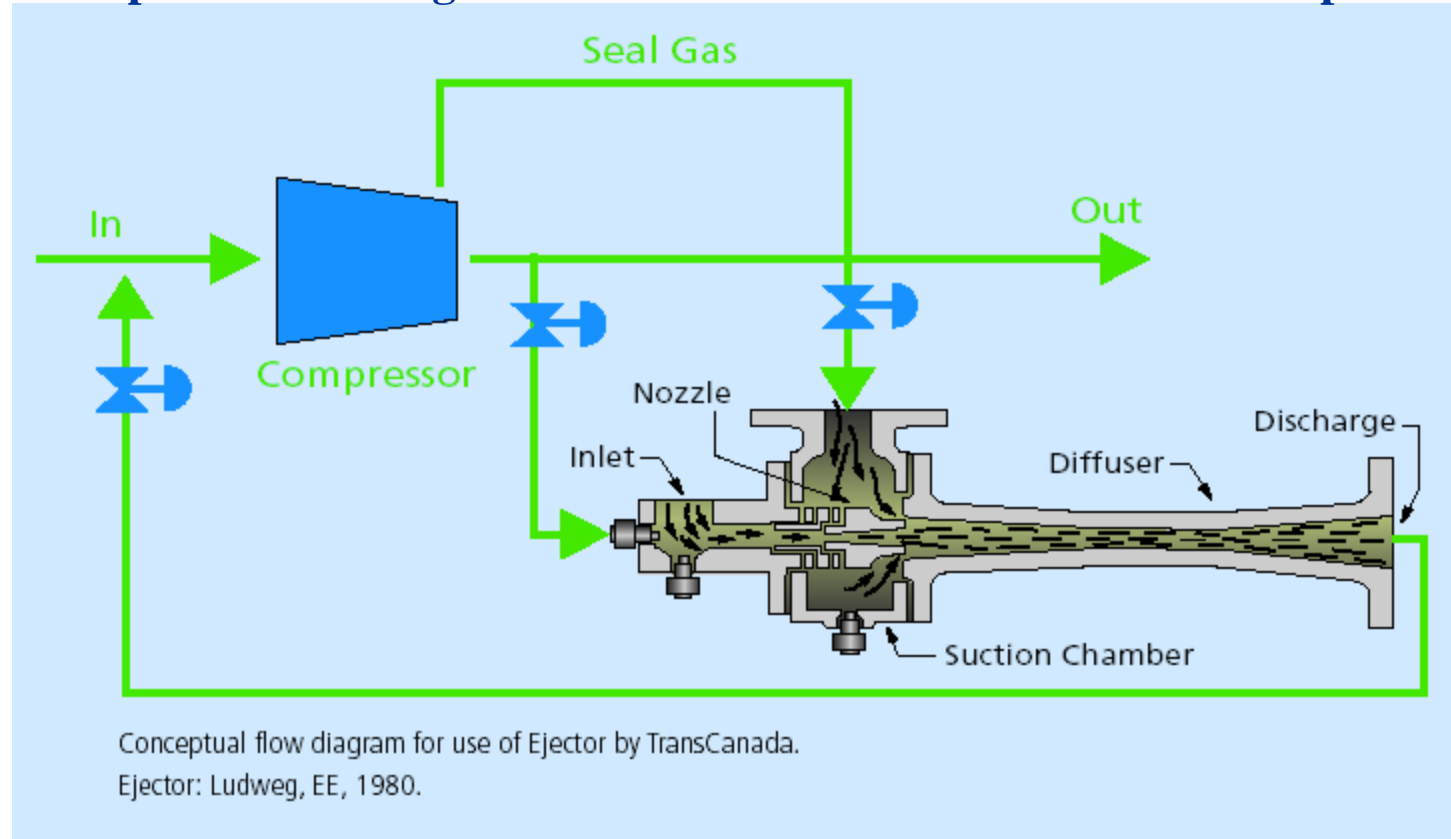


Gas-Gas Ejector for Dry Gas Seal Leak Capture



Conceptual Flow Diagram

US & Canadian patent filed



Use of Biofiltration for Methane reduction



- A joint venture of TransCanada & University of Calgary
- Methane gas can be oxidized biologically, with the use of methanotrophic bacteria
- Vented CH₄ reduced to CO₂: 21 times less global warming potential
- Implemented successfully at three sites
- No operating cost except monitoring
- Almost 80% oxidation rate achieved
- Biocell/Biocap/Biofilter research *received 2007 Emerald Award*



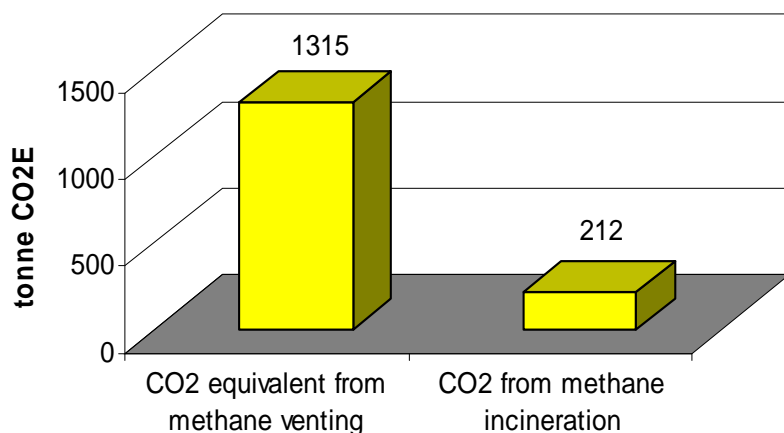
Use of Incinerator for Blowdowns



- Incineration of blowdown gas instead of venting (after transfer compression)
- At Caron Compressor Station, Moose Jaw, November 2002



GHG Emission Comparison with & without Incineration after Transfer Compression



- Emission savings of 1,100 tCO₂e
- Worth \$17,000 @\$15/t CO₂e

End Results - EMS



- Confidence
 - The ability to quickly and accurately quantify inputs into important business decisions
 - The success of our measurement program can be widely used
 - The success of our Management System can be quantified
 - Internal interest and buy-in is fostered