



PTAC

**PETROLEUM
TECHNOLOGY
ALLIANCE
CANADA**

Energy Audit Assistance

The First Step in Energy Management

Energy Management Workshop - “The Fuel Gas Challenge”
January 15-17, 2007

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Outline

- **PTAC, NRCan and Energy Audits for Oil and Gas**
- **Energy Audit Incentives**
 - What is it?
 - Incentive applications approved
 - Facilities targeted by applications
- **Information Sessions and Events**
- **Business Case for Energy Efficiency**
- **Fugitives Fact Finding Report**
- **Energy Efficiency Knowledge Center**
- **Questionnaire - What the industry said they needed**
- **Current Status & Summary**

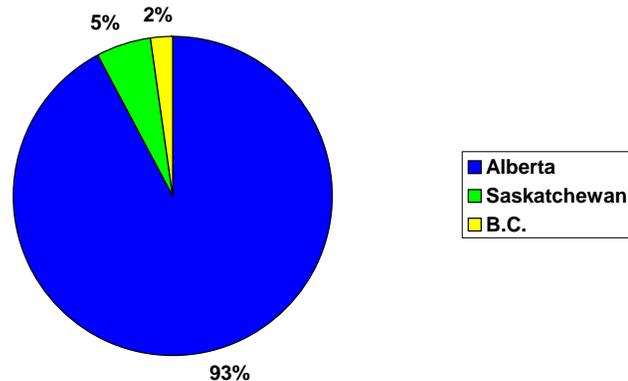
PTAC, NRCan and Energy Efficiency

- **Contracted since 2002 to deliver NRCan's Office of Energy Efficiency Industrial Energy Audit Incentive.**
- **Scope:**
 - **Administer/Review Incentive Applications**
 - **Hold Workshops - Energy Efficiency (EE) Knowledge Transfer**
 - **Develop a Business Case for Energy Efficiency**
 - **Fact Finding on Oil and Gas Fugitive Emissions**
 - **Develop an EE Knowledge Centre**
 - **Assess Support Needs for the Oil and Gas Industry**
- **Why do Audits?**
 - **First step to reducing energy use and enabling energy management**
 - **Professional third party auditors bring new insights and knowledge of other similar operations**

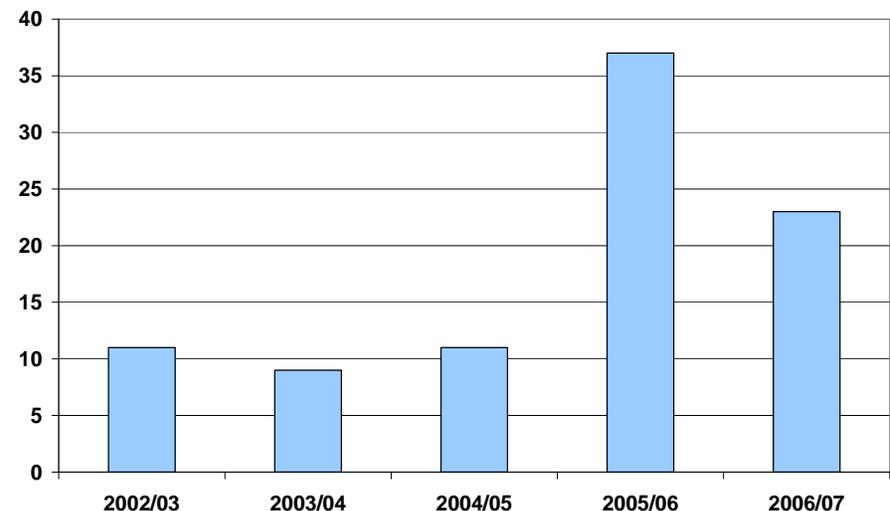
Industrial Energy Audit Incentive Program

- 50% of audit cost up to a maximum of \$5k/audit per “facility” per year. Limited to \$50k/yr per company in final year
- Oil & Gas made up 13% of NRCan co-funded industrial audits

Distribution of Oil & Gas Audits Co-funded by NRCan
2002/07

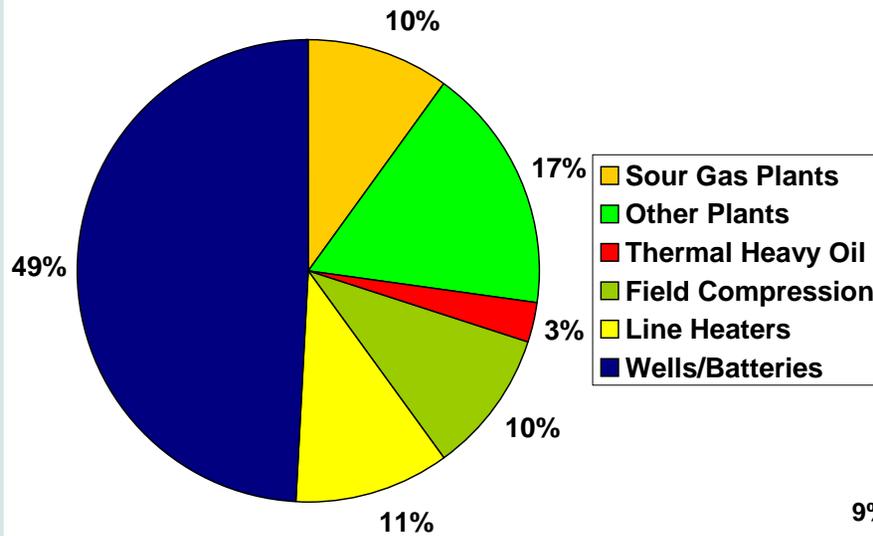


Oil & Gas Energy Audits Co-funded by NRCan 2002/07

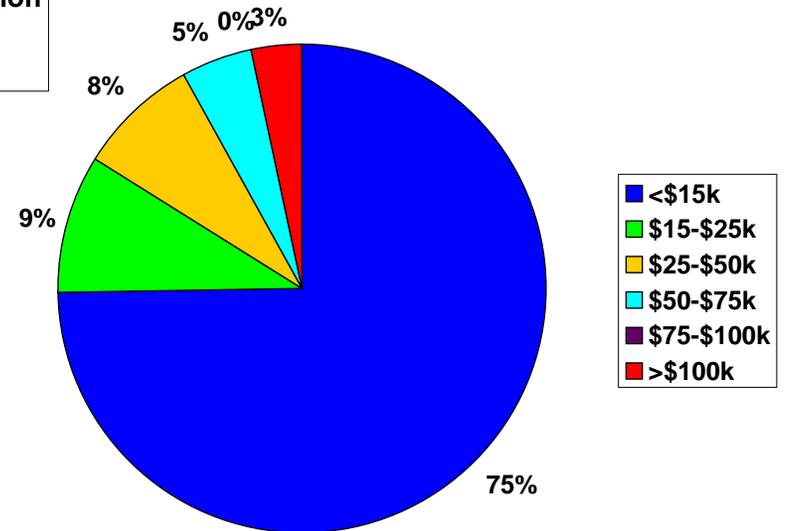


Facilities Targeted and Audit Cost*

Types of Facility Audits



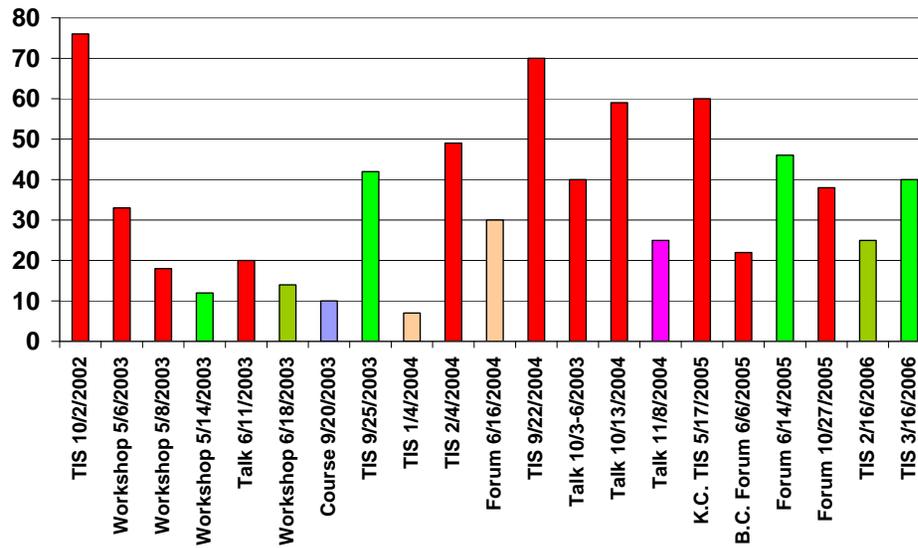
Cost of Audits



(* - based on applications submitted)

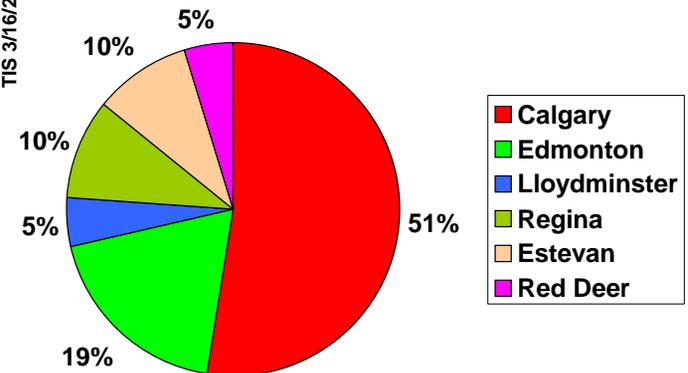
Information Sessions and Events

Attendees By Date and Location



- 21 Information Sessions & Events
- Split Between Calgary and Other Locations

Distribution of Events

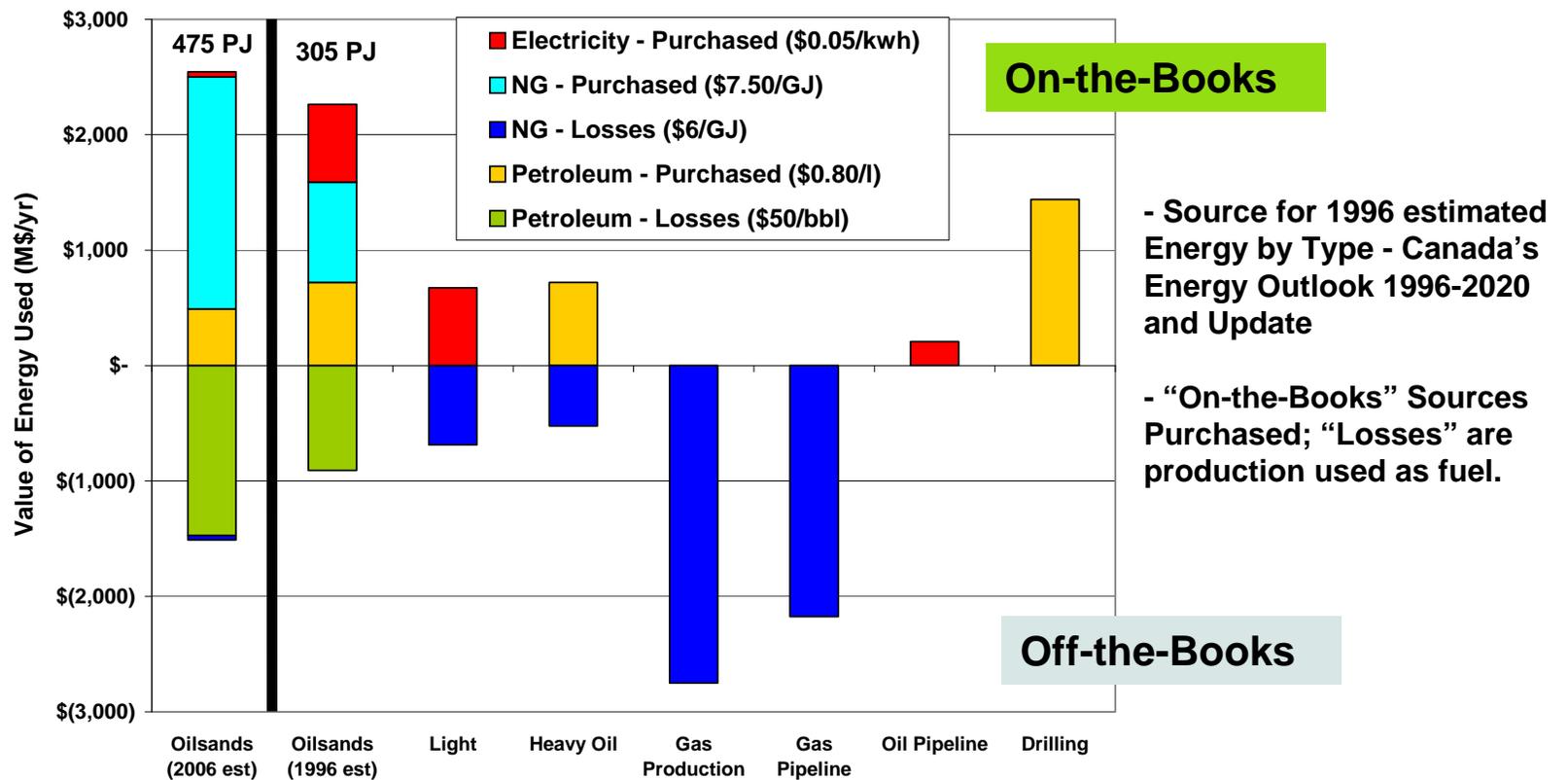


Why an Energy Efficiency Business Case?

- Define the potential prize to encourage more audits and actions
- Future energy resources will be more energy intensive to recover
- Learning how to be more efficient now develops tools needed for the future
 - Conventional Oil - More EOR (water, gas, solvents)
 - Heavy Oil - What follows primary heavy oil production?
 - Bitumen - More production with less energy for thermal production and upgrading --> Lower quality sands over time
 - Natural Gas - Lower pressure sources (CBM and unconventional gas) require more compression of gas from smaller sources
- Consider costs of solutions as well as the prizes

- “Business Case for Energy Efficiency in the Upstream Oil and Gas Industry” March, 2006 available for download from www.ptac.org/iei1.html

Value of 2005 Energy Use by Upstream Oil & Gas Industry - Over \$12 Billion/yr



- Oilsands energy use 56% higher than 1996 forecast; energy value only 42% higher due to cogeneration using same unit prices for energy commodities
 - Source for Oilsands (2006 est) Canada's Energy Outlook: The Reference Case 2006

Size of the Prize - Conventional

- **Over \$1 billion/yr Potential Savings in Conventional Oil and Gas**
- **Compression - Monitoring and Control - Over \$400 M/yr**
 - Improve efficiency of engines and reduce recycle (15%)
- **Flaring and Venting - Over \$200 M/yr**
 - Solution Gas conserved to 98+% for all companies
- **Heavy Oil Trucking - Over \$150 M/yr**
 - Extend sales pipelines to reduce haul distances
- **Improve Field Heaters - Over \$100 M/yr**
 - Upgrade heaters and shutdown unnecessary heaters
- **Reduce Power Purchases - Over \$100 M/yr**
 - Convert to more Distributed Power Generation
- **Other Sources - Over \$50 M/yr**

Size of the Prize - Oilsands

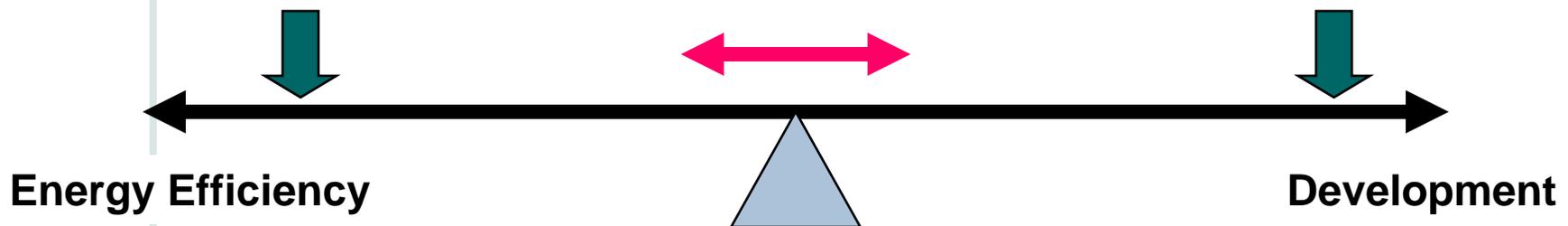
- **Likely over \$500+ million/yr Potential Savings in Oilsands - And Growing!**
- **Cogeneration for Power and Heat**
 - **Already over 1,000 MW of Cogen (70-80% eff) in Oilsands replacing Coal Power (30% eff)**
 - **Oilsands excellent locations for Cogen as they need large amounts of power and heat**
- **Shift to lower cost “Off-the-books” energy**
 - **Energy self-sufficiency is the goal. On-site upgrader provides fuel for steam and power for Mining and SAG-D**
 - **Reduces energy needed to supply gas, power, etc.**
- **Process Efficiency Improvements**
 - **Continually needed as production moves into lower quality sands, which will increase energy intensity**

Economic Balance of Energy Efficiency vs. Development

Lower Return on Capital
Present Value Driven
More People Required
Long-term View
Sustainable Growth

Higher Return on Capital
Payout Driven
Fewer People Required
Short-term View
Rapid Growth

What is the
Desired Balance?



- Estimated Capital Cost of \$2 billion to save \$1.5 billion/yr
- Payouts Range from months to 3-4 years

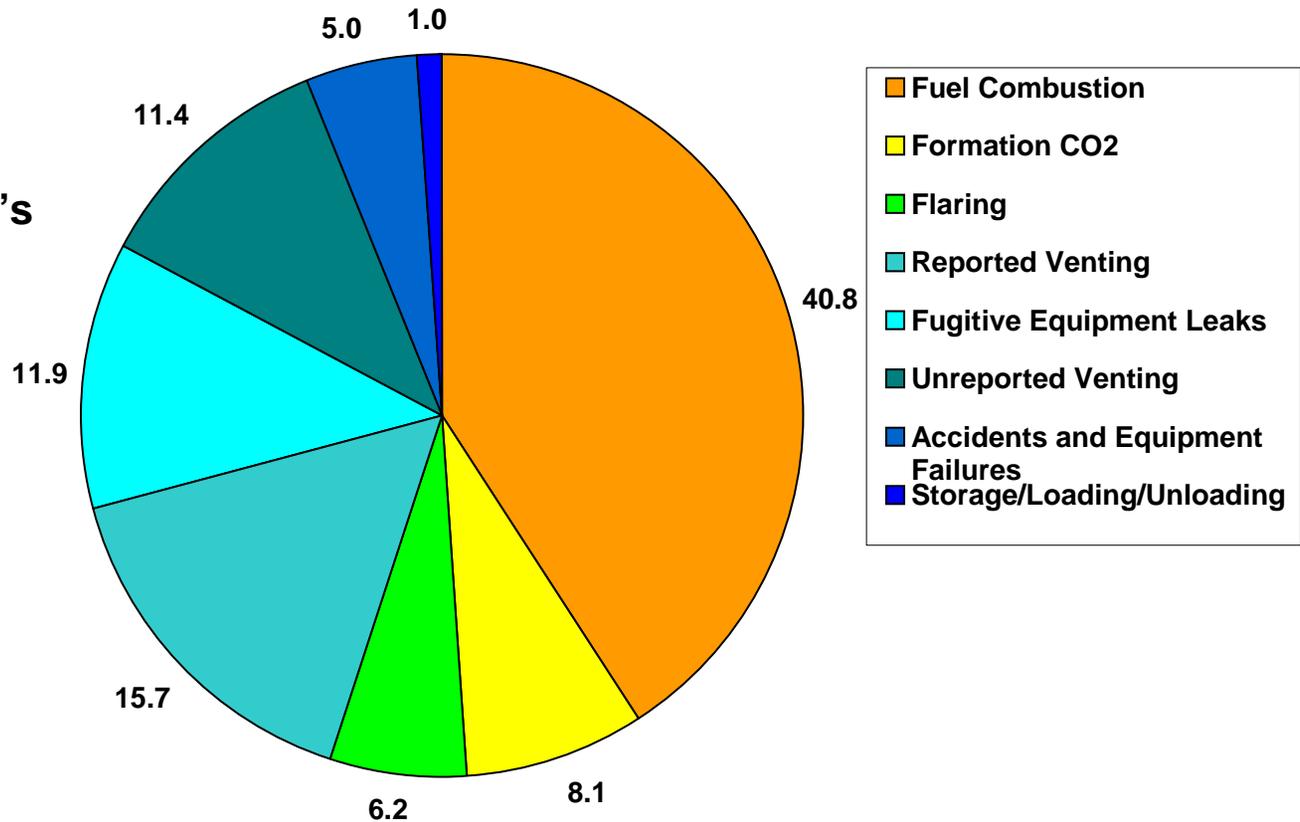
Fugitives Fact Finding Report

■ Scope:

- Rationalize differences between UNFCCC and other definitions of “fugitives”
 - Summarized latest CAPP information on GHG and other fugitive emissions
 - Discuss which streams are controllable and therefore reducible
 - Provide information on existing technology options to reduce non-combustion emissions and energy losses
 - Discuss economic drivers for reduction of various emission streams, barriers to implementing solutions and potential incentives to encourage mitigation
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- **“Upstream Oil and Gas Fact Finding Report on Fugitives” March, 2006 available for download from www.ptac.org/iei1.html**

Upstream Oil and Gas GHG Emissions

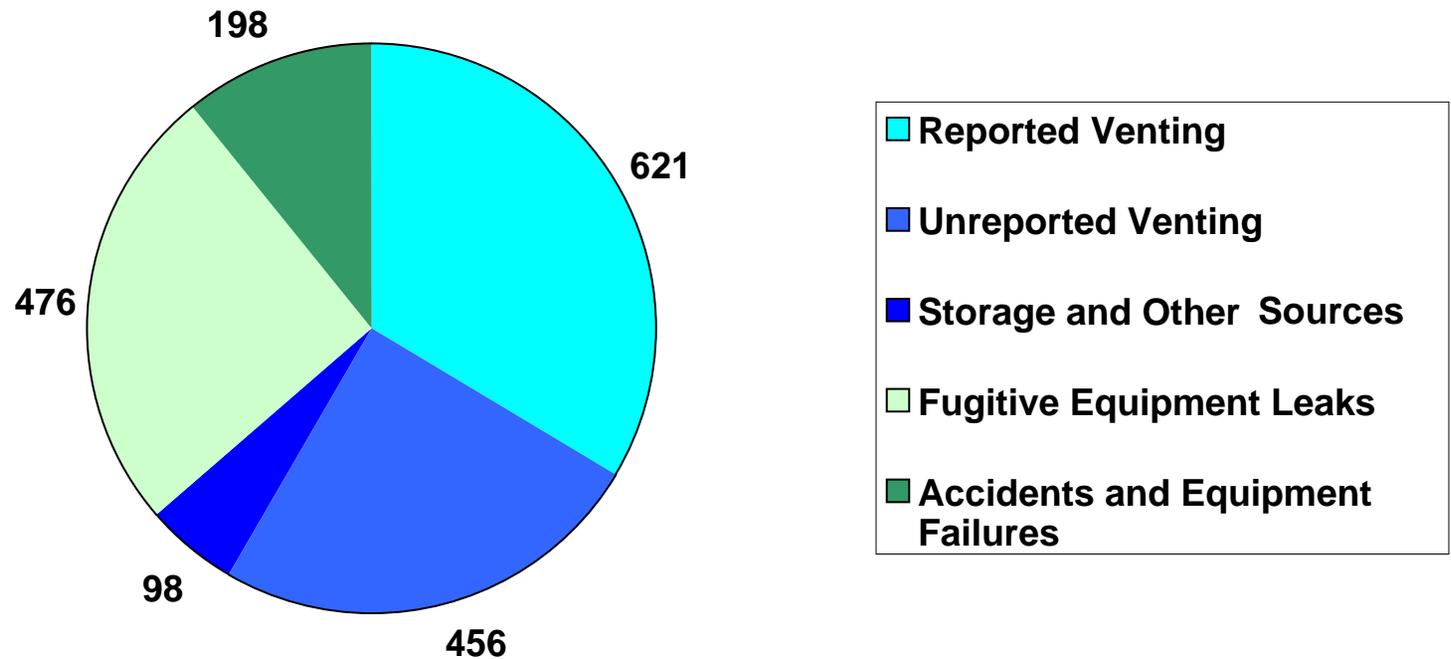
Percentage of GHG Emissions by Source Category (CAPP 2005-0011)
(Excludes Oilsands)



Total = 101 MtCO₂e
Approx 14% of Canada's
GHG Emissions

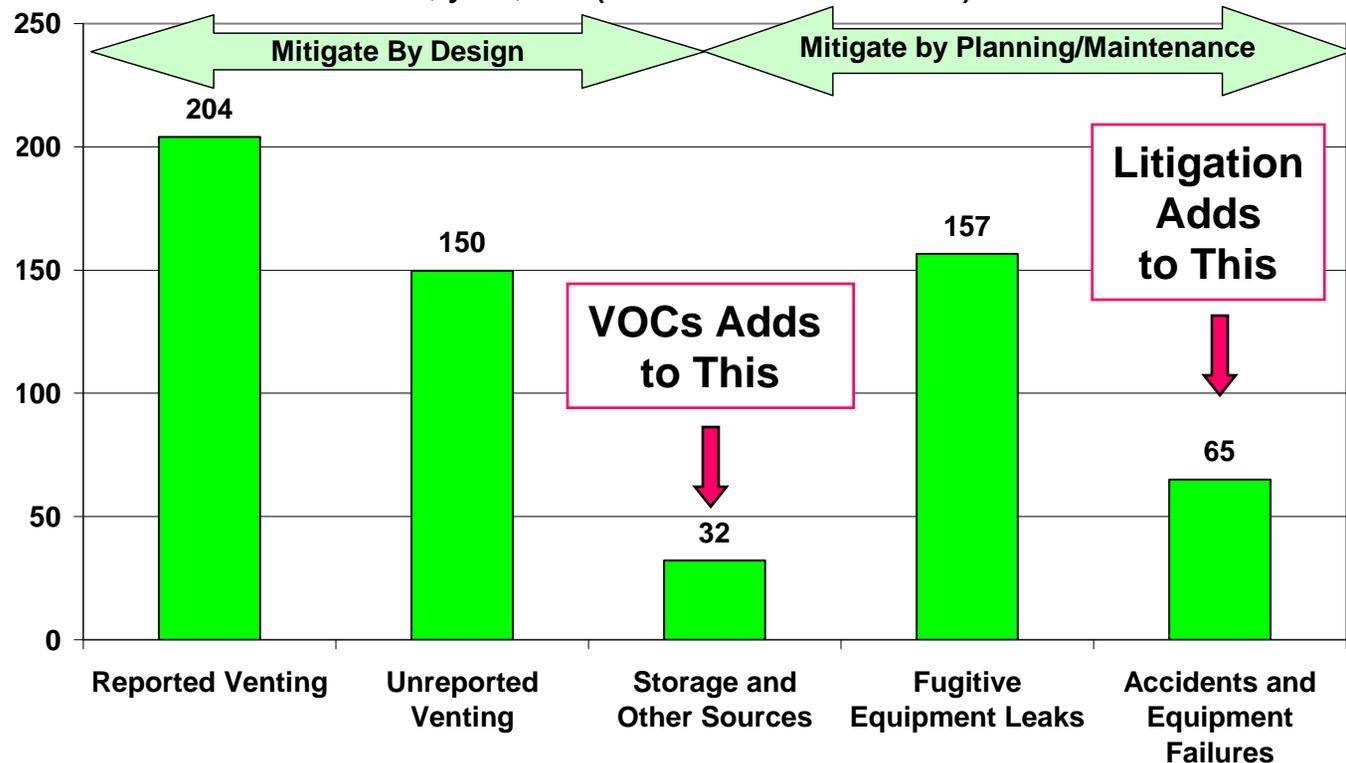
Main “Fugitive” (UNFCCC) Emission Streams of Concern

Methane Emissions - kt/yr (CAPP 2005-0011)
All Fugitives - UNFCCC; Vents (Blue)



The Economic Prize - Fugitives Capture

Value of Annual Methane Losses from Upstream Oil and Gas Operations
M\$/yr @\$6/GJ (Based on CAPP 2005-0011)



Value of Fugitives
= \$0.6 billion/yr

2003:
Producer Sales
= \$78 billion/yr
Royalties to Provinces
= \$11 billion/yr

Energy Efficiency Knowledge Centre

- **Funded by Natural Resources Canada's Office of Energy Efficiency in support of the Industrial Energy Audit Incentive**
- **Responds to feedback that knowledge about energy efficiency opportunities is needed**
- **Focus is on economic solutions as Industry's #1 Priority is to reduce Operating Costs**
- **Twenty one page fact sheets have been generated on key topic areas**
- **Website: www.ptac.org/know1.html**

Key Energy Efficiency Topic Areas

20 One-Page Information Sheets on PTAC EE Website on:

- 1. Thermal Heavy Oil**
- 2. Sour Gas Plants**
- 3. Conventional Heavy Oil**
- 4. Sweet Gas Plants**
- 5. Shallow Gas**
- 6. Compression Equipment**
- 7. Water Use and Management**
- 8. Flaring and Incineration**
- 9. Fired Heaters**
- 10. Co-generation of Heat and Power**
- 11. Vent Gas Management**
- 12. Electrical Power Usage**
- 13. Inert Gas for EOR**
- 14. Truck Fleets**
- 15. Dehydrators**
- 16. Oil Batteries**
- 17. Fugitives**
- 18. Artificial Lift**
- 19. Pipelines**
- 20. Instrumentation**

Plus copies of presentations from workshops

Energy Conservation Questionnaire

- **Purpose - to assess industry needs to assist with energy efficiency efforts**
- **Timing - March 2004**
- **Key Findings:**
 - **Primary value from PTAC --> workshops, forums --> Tech Transfer**
 - **Producers are engaged in auditing and increasing efforts to make energy efficiency improvements**
 - **Mixture of internal and external audits**
 - **Industry sees primary government roles are to:**
 - **Provide incentives for action through royalty/tax incentives**
 - **Increase clarity of targets and rules governing energy use**
 - **Enforcement of regulations to encourage conservation**
 - **Producers were aware of energy audit incentives even if they chose to go it alone**
- **See report on questionnaire results at:**
<http://www.ptac.org/links/dl-eie/ieai0401.pdf>

Current Status and Summary

Current Status:

- Applications no longer being accepted for 2006/07 budget year
 - Last date December 22, 2006
- Final Task for 2006/07 is to update and add to Knowledge Centre
 - Update/enhance one page sheets
 - Add case studies
 - Materials generated will remain on the PTAC website
 - Technical Information Session planned for late February

Summary:

- PTAC activities to promote audits and provide knowledge transfer appear to be valued based on event attendance and feedback
- Key champions have led focused efforts in major energy efficiency areas such as power use, fired equipment and integrated plant audits
- Support to reduce audit costs allowed champions to maximize the number of audits in key areas and achieve significant results quickly

Acknowledgements and Contact Info

- NRCan Office of Energy Efficiency - Melanie Phillips, Ann Martineau, Catriona Armstrong (CIPEC)
- PTAC Staff - Eric Lloyd, Brenda Belland, Arlene Merling, Dori Skea
- All those who contribute to encouraging energy efficiency in oil and gas operations

PTAC Energy Efficiency Website

■ www.ptac.org/iei1.html

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