Improving Heavy Oil Production through Solvent Conservation and Emission Mitigation

Heavy Oil Working Group
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Emissions mitigation and solvent recovery present an opportunity in heavy oil operations...

- Flaring, venting and fugitive emissions are a growing global concern
  - Several countries committing to more stringent methane and VOC regulations – incl. Canada
  - Flaring is being targeted for reduction internationally

- Technology and practices can reduce these emissions and provide benefits
  - Recovery of methane and hydrocarbon solvent commodities
  - Cost saving energy management options
CanmetENERGY-Devon and partners develop technologies and practices...

- Canadian partnerships demonstrate technologies to economically improve hydrocarbon recovery, emissions reduction, and energy management
  - Optical technologies for methane and solvent commodity quantification from vent and flare streams
  - Gas and liquids recovery technologies and practices that increase energy and solvent availability
  - Energy and process management systems to optimize energy integration and reduce emissions

- Plume monitoring technology to quantify black carbon PM2.5 emissions from flaring rich gases
...and identify opportunities and best practices for oil and gas operations domestically...

- Developed a comprehensive techno-economic analysis process based on:
  - Thorough evaluation of **current technology, practices, and cost** of technically achievable opportunities to reduce emissions
  - Assessment for **available “cost effective” options** that facilities or jurisdictions can prioritize for immediate emission reductions
  - Ongoing research to **enlarge the suite** of available “cost effective” technology and practice options for industry and government – in partnership with regulators, academia and industry
...and internationally with PEMEX in Mexico...

- **Partners**: PEMEX Refinacion and PEMEX Exploración y Producción (PEP)

- **Refinery Assessment - 2012-13 NAMA projects:**
  - **Flaring Reductions**: 1.3 Mt/yr GHG reduction and US $237 M/yr avoidable commodity losses
  - **Fugitive Steam Losses**: 22 Kt/yr GHG emissions reductions and $18.9 M/yr avoidable energy use
  - **Switching flare assist (steam to compressed air)**: 15.7 Kt/yr GHG emission reduction and $1.3 M/yr avoidable energy use

- **PEP - Summer 2015 CCAC projects:**
  - **Projects**: Significant CAPEX currently being allocated for methane and solvent recovery from gas streams
  - **Opportunity**: US $84 million annual commodity recovery and 8.2 Mt GHG reduction over life of control technologies
…and heavy oil producers in Colombia.

- **Partner:** EcoPetrol
- **Heavy Oil Battery - 2012-13 NAMA projects:**
  - **Flaring & Venting:** 211 Kt/yr GHG reduction and US $50 M/yr avoidable commodity losses
  - **Cost & Payback period:** Capital costs of assessed opportunity is US $24.6 million and the payback period is 6 months

- **Partners:** Pacific E&P and Mansarovar
- **Summer 2015 CCAC projects:**
  - June 2015 technology workshop with government and industry
  - August 2015 energy and emissions measurement & prefeasibility study
Continuing research to develop new practices and technologies

- Partnership with academia to **further developing key measurement and sensor technology** to better assess:
  - Storage tank venting (optical methane and VOC measurement technology)
  - Flares and PM2.5 / black carbon emission rates (optical camera)
  - Continuous detection and source location of fugitive methane and VOC emissions (sensor development)

- Collaborating with industry researchers to **develop management practices and technologies** to address:
  - Energy inefficiencies and hydrocarbon products losses (process controls)
  - Turn waste gas into condensable hydrocarbon solvent (recovery system)
  - Improve economic, energy, & emission evaluation (management systems)
Opportunities for Collaboration

- Collaboration under *international climate or clean energy partnerships* to advance technology and practice development and deployment
  - UNEP Climate and Clean Air Coalition (CCAC)
  - Global Methane Initiative (GMI)
  - Intergovernmental Panel for Climate Change (IPCC)

- Collaboration between *national environmental and energy laboratories and petroleum research institutes* to advance technology and method development
Thank You!

For further information please contact:

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