

REAL-TIME VALUE

LONG TERM BENEFIT: Reduction of GHG emissions with verifiable data to collect carbon offset credits

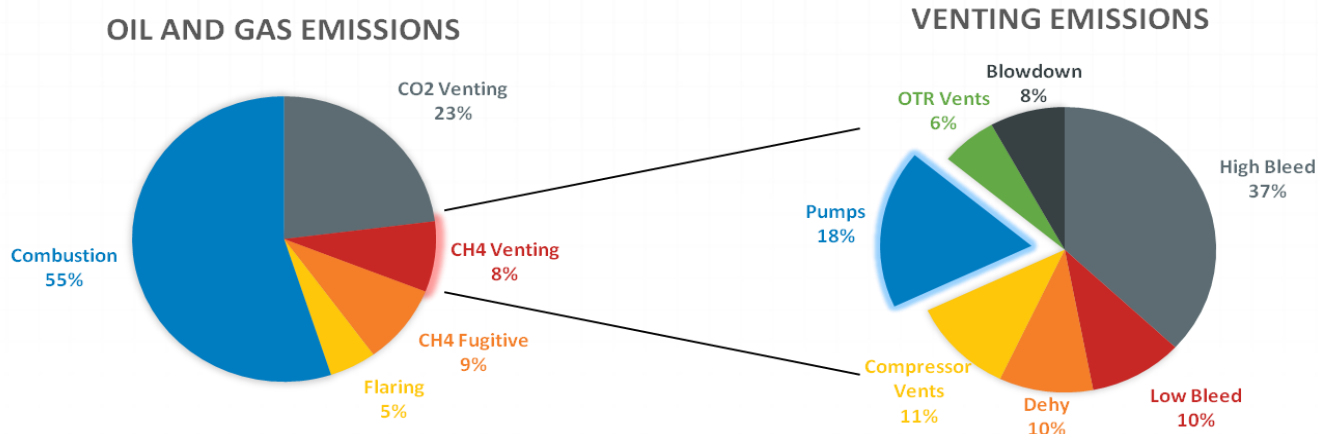
Situation

- ConocoPhillips Canada was using traditional gas driven pumps to inject chemical. The pumps vented on average 75 tCO₂e/yr per pump.
- The oil and gas industry uses a variety of chemical products to prevent issues such as hydrate formation and corrosion

Conventional Pneumatic Pump Technology Issues

- Vents methane to the atmosphere each pump stroke (**GHG emissions**)
- Lack of chemical injection precision (**over/under-injection**)
- Requires frequent operator intervention (tightening packing, parts changes)
- 1940's technology

Of the 30 Mega tonnes of methane emissions that Alberta's oil & gas industry generates, 18% is from pneumatic Injection pumps which is 5 Mega tonnes of carbon dioxide equivalent per year



*The Alberta Innovates Upstream Asset Study performed by Cap-Op has estimated that there are approximately **145,000 pneumatic pumps** being used in Alberta.*



*The CAPP Best Management Practice for Chemical Injection Pumps (2004) estimates that there may be **over 1,000,000** gas driven chemical pumps in the oil and gas industry*

Solution

- ConocoPhillips replaced gas-driven pumps with Solar Injection Systems in both retrofit and new construction applications
- ConocoPhillips trialed several pump manufactures and standardized on Sirius' Stealth Injec-

Sirius Solar Pump Technology

- Modern **emission-free** design
- Precise chemical injection (**reduces chemical wastage**)
- Advanced STAR controller (**verifiable offset credit data recording**)



Emissions Benefits

- Each pump removes about 75 tCO₂e/year, depending on injection rate and process factors eliminated amounts varied from 13—400 tCO₂e/yr per pump.
- Fuel gas savings of approximately 18 scf/h per pump
- Ability to apply for Carbon Offset Credits under the Revised Quantification Protocol for Methane Venting Reductions

Of the 1,700 green projects completed by ConocoPhillips, switching from Pneumatic chemical pumps to emissions free Sirius Solar Injection Systems was one of the most cost-effective means of reducing emissions.



Results

Immediate Emissions Elimination

- ConocoPhillips project involved the installation of 86 injection systems across Alberta and resulted in significant elimination of vent gas.

Improved Economics

- ConocoPhillips has the ability to apply for Carbon Offsets under the Revised Quantification Protocol for Methane Venting Reductions and potentially receive offset credits for the next eight years. Additionally, ConocoPhillips greatly reduced their chemical wastage due to the accuracy of the systems versus traditional style pumps.

Improved Corporate Image

- As a result of this project, and their other green initiatives, ConocoPhillips is now viewed as an environmental leader in the industry.

GHG Reduction (tCO₂e/year)	12,040
Cost Abatement (\$/tCO₂e)	\$4.78**

**Based on 20 year project life at 140 tCO₂e/y per pump

