



UNECE Group of Experts on Coal Mine Methane

The Case for Robust Technical & Policy Support for Coal Mine Methane Emission Reductions

Raymond Pilcher

President

Raven Ridge Resources Incorporated

Chair, UNECE Group of Experts on Coal Mine Methane

Clark Talkington,

Vice President

Advanced Resources International, Inc.

Vice Chair, UNECE Group of Experts on Coal Mine Methane

Methane is a climate pollutant

- #2 Greenhouse Gas: CH_4 = 16-20% of global climate forcing
- High GWP - IPCC 5th Assessment Report: CH_4 GWP = 28-34 (100-year time-frame)
- CH_4 the principal short-lived climate pollutant – much higher GWP on shorter time-frame
- Opportunities exist in all CH_4 sectors to reduce emissions
 - Petroleum and natural gas
 - Landfills
 - Coal mines
 - Manure digesters and other agricultural sources
 - Industrial and municipal biogas
- CH_4 is especially attractive as a target for GHG abatement
 - High GWP
 - Energy resource – capture and use can generate revenue

Cost-effective opportunities for CMM recovery and use

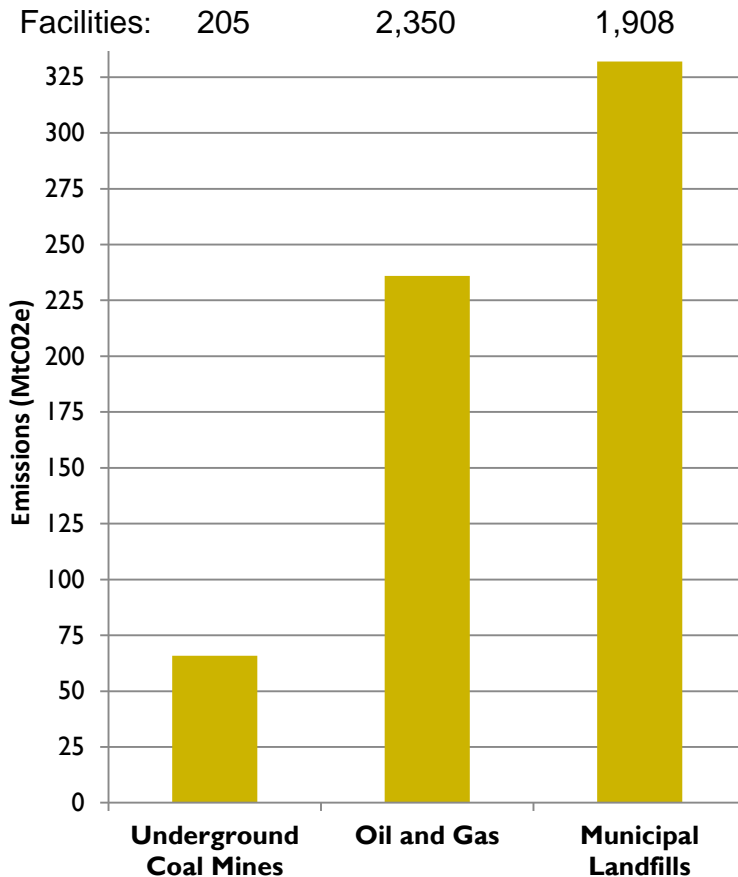
- Most attention focused on petroleum and landfill sectors
- Critical to address all CH₄ emitting sectors including CMM
 - Coal production and use will continue to grow worldwide especially in emerging economies
 - Necessary to “green” the coal sector
 - Contributes to effective allocation of resources in battling climate change
 - Data support robust technical and policy support for CMM

U.S. Greenhouse Gas Emission Data

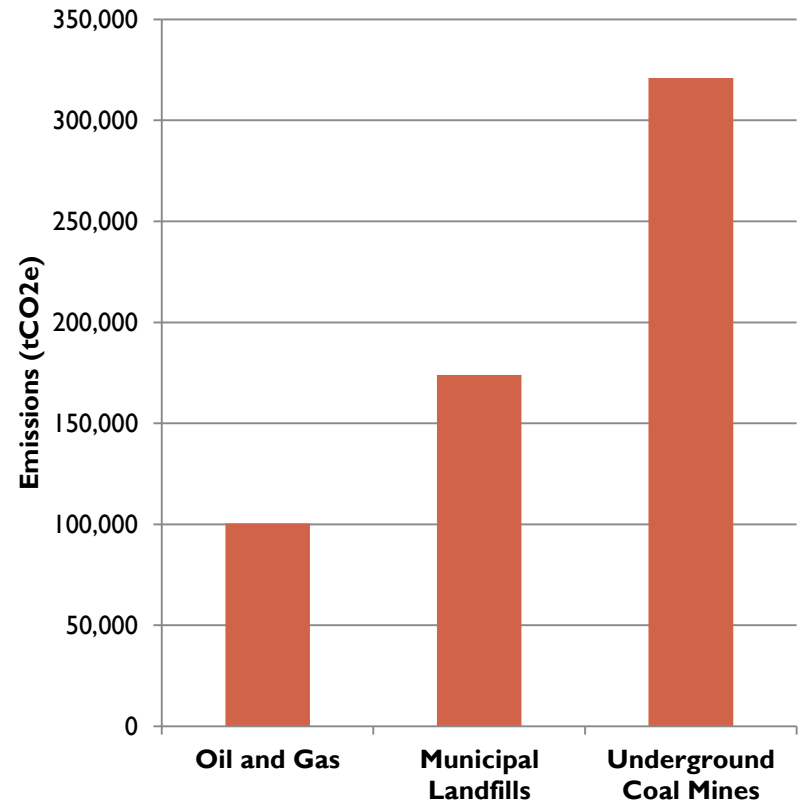
- 2 Sources
 - U.S. Inventory of Greenhouse Gas Emissions & Sinks
 - U.S. Greenhouse Gas Reporting Program
- Both include major CH₄ sectors
 - underground coal mines
 - oil & gas
 - landfills
 - *manure management included in Inventory but not Reporting Program
- Data provides interesting perspective on CMM

2014 GHG Liberation from Major U.S. CH₄ Emitting Sectors

GHG Liberation by Sector



Sector GHG Emissions per Facility



*Oil & Gas includes process and combustion CO₂ emissions

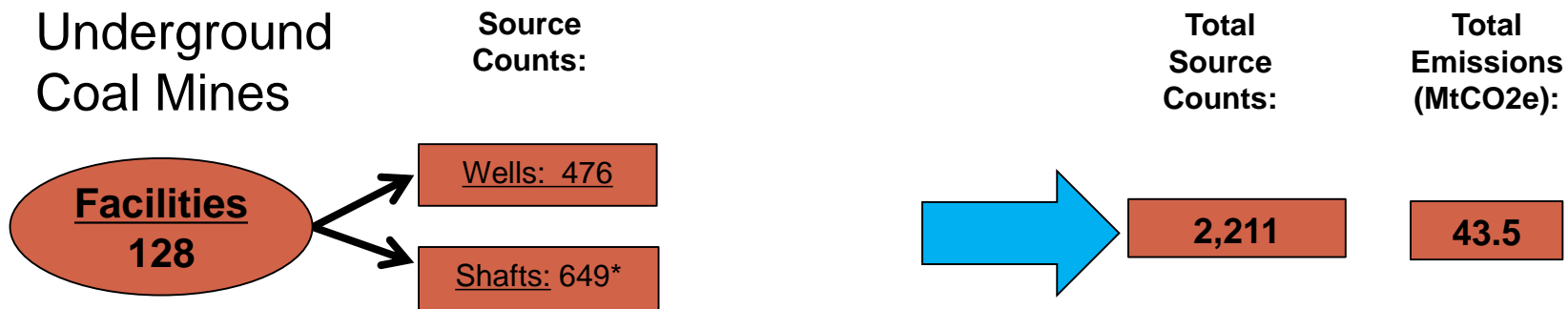
Source: CMM & LFG - 2013 US GHG Inventory; O&G - U.S. GHGRP 2014

Oil & gas sector

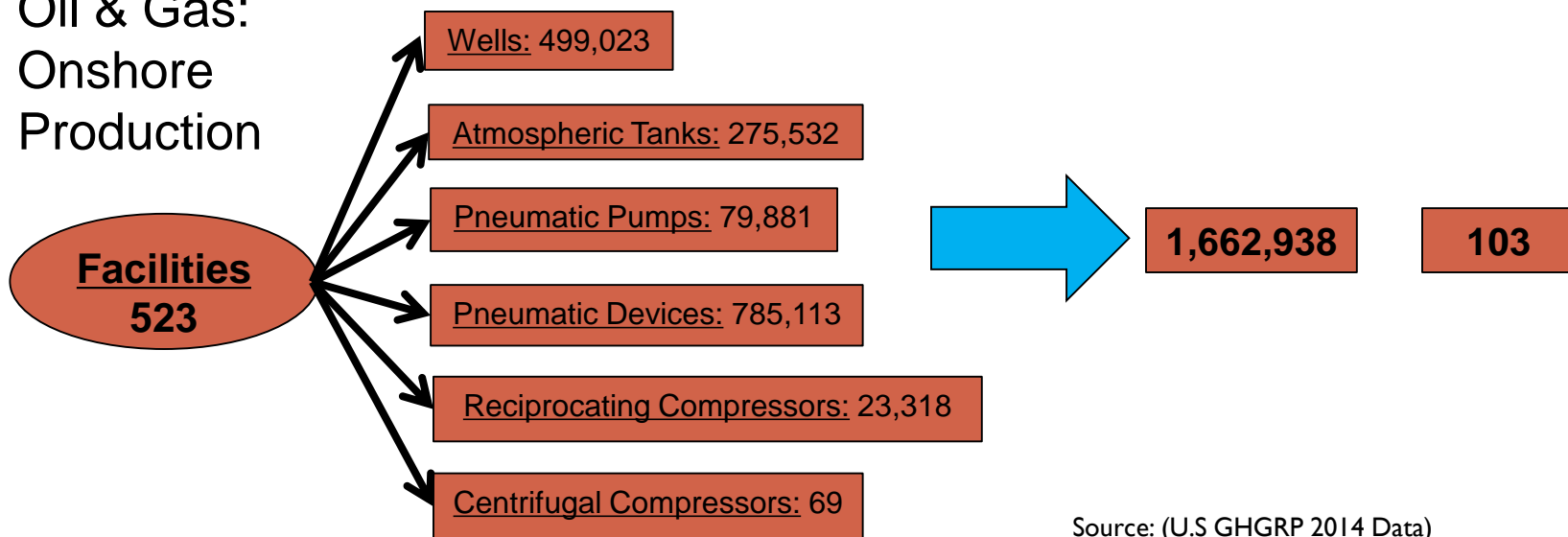
Segment	Number of Facilities	GHG Emissions (Million Metric Tons CO ₂ e)
Onshore Production	523	103
Offshore Production	128	7
Natural Gas Processing	464	60
Natural Gas Transmission	520	22
Underground Natural Gas Storage	53	2
Natural Gas Distribution	181	15
LNG Import/Export	7	1
LNG Storage	5	< 1
Other Oil and Gas Combustion	488	28
Total	2,350	236

CMM and O&G On-shore Production equipment counts from the Greenhouse Gas Reporting Program (i.e., point sources for emissions)

Underground Coal Mines



Oil & Gas: Onshore Production



Source: (U.S GHGRP 2014 Data)

*Total shafts are believed to be lower because some reporters over-count: average is 3 shafts per mine

Key take-aways

- CH₄ the principal short-lived climate pollutant – much higher GWP on shorter time-frame
- Reduction of CH₄ emissions presents the most cost effective near-term strategy for GHG reductions
- Will be many years before coal is completely supplanted by other energy sources - Greening coal sector is critical!
- Data show the comparative economic value of a continued and robust focus on reducing Coal Mine Methane emissions
 - Higher emissions on a per facility basis
 - Limited number of point sources
 - Concentrated geographical operations
 - Ready markets for the gas at the mine or in local/regional markets
 - Reinvestment of revenues into mine operations and mine safety

Impact on CMM GoE Programme of Work

- Could provide the foundation for more aggressive advocacy on the benefits of CMM capture and use
- Help guide the priorities of the International Centre of Excellence and dissemination of Best Practices
- Other?