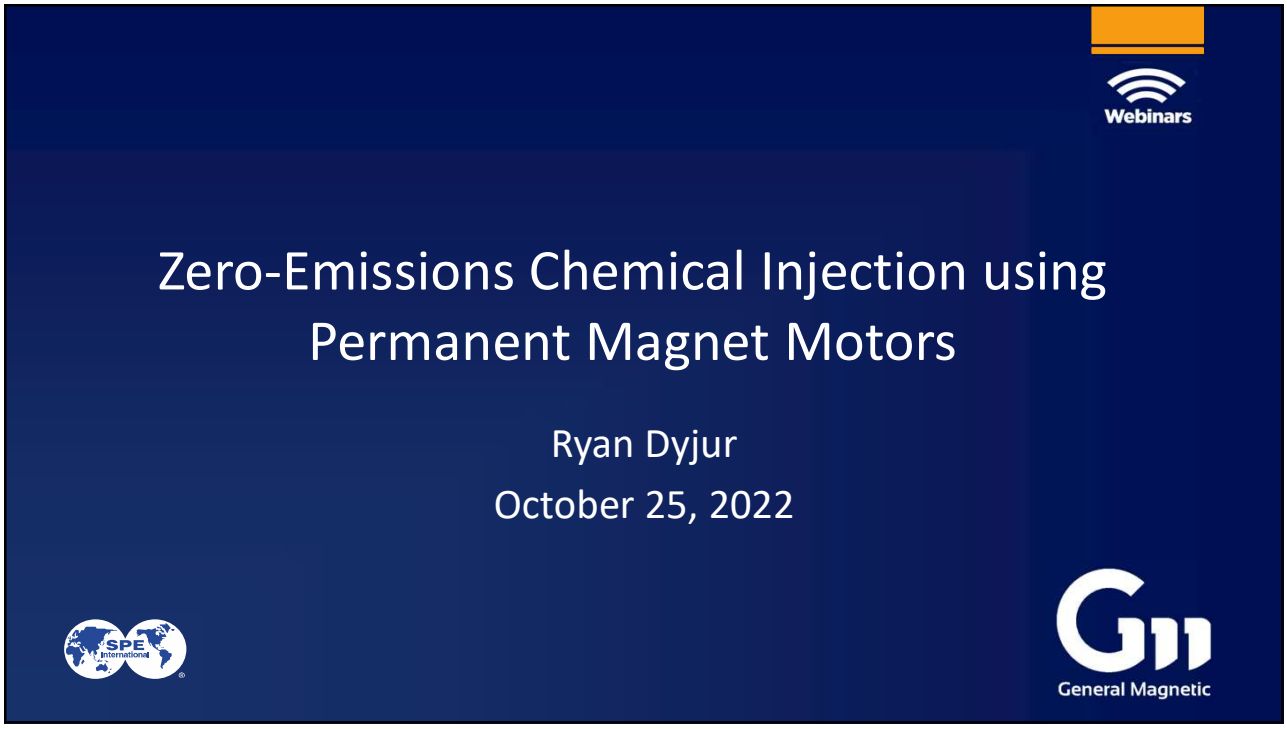
Webinars
Zero-Emissions Chemical Injection using Permanent Magnet Motors
Ryan Dyjur
October 25, 2022
SPE International
General Magnetic

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Agenda

1. The challenge
2. Emissions from Pneumatic-driven chemical pumps
3. Permanent magnet Motors

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The Challenge

Initiative	Proponent	Target Emission	Reduction %	By	Baseline
Alberta Methane Reduction	Government of Alberta	Methane	45%	2025	2014
Global Methane Pledge	Government of Canada, Global Methane Pledge	Methane	75%	2030	2012
Emission Reduction Plan	Government of Canada	Methane	40-45%	2025	2012
			75%	2030	2012
		CO2e	31%	2030	2005
Pathways Alliance	Oilsands Producers	CO2e	Net Zero	2050	-
Inflation Reduction Act	US Federal Government	CO2e	31-44%	2030	2005

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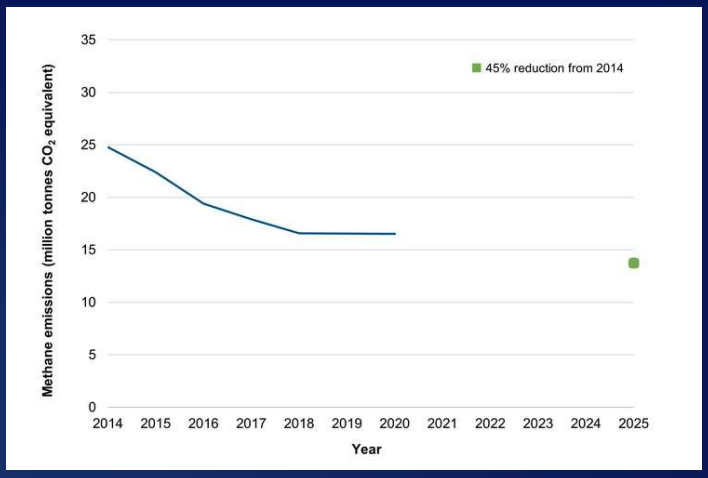
Alberta Methane Venting Progress



Source: Alberta Energy Regulator

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Global Push for Emission Reductions

- Intensifying global competition for low-carbon energy
- The future for natural gas is in differentiated gas
- MiQ, Equitable Origin, GTI Veritas, OGMP 2.0, IES Trustwell
- Other global emissions initiatives including Ipieca, OGCI (Oil & Gas Climate Initiative, ZRF (Zero Routine Flaring by 2030)

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The Challenge

- Pneumatic-driven pumps one of the largest sources of emissions
- Solar chemical injection solutions eliminate venting
- Challenge is to enhance solar chemical injection potential by reducing energy consumption
- Need for proven, robust solutions

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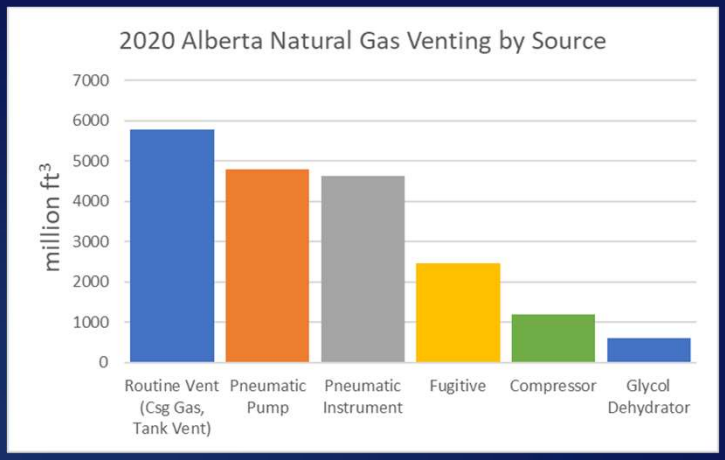
Why Pneumatic Pump Replacement?



Source: Alberta Energy Regulator

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Why Permanent Magnet Motors (PMM)

- High torque, highly efficient
- Low power consumption on startup – 300 to 400 mA
- Reduces solar and battery requirements
- Long battery autonomy
- Hazardous locations
- PMM delivers precise injection into a wide range of pressures
- Motor capable of instant peak torque at any RPM

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Other Applications for PMM Technology

- Mini Compressors for instrument air – eliminates methane venting on pneumatic natural gas driven instruments
- Solar Heat Trace
- Other fluid transfer

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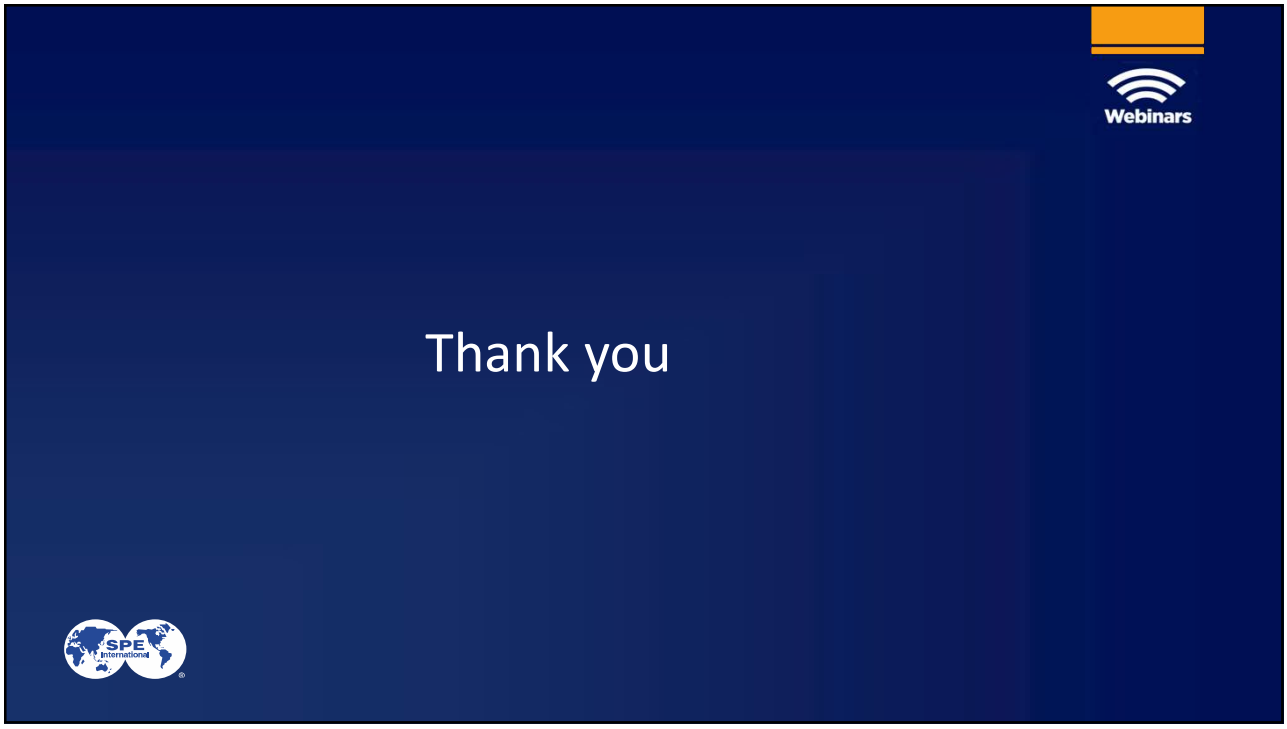

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