geoconvention
Virtual Event
September 13 - 15
2021

Unlocking Economic Zero Bleed Pneumatic Instrument Air Retrofits: A Review of Learnings from Westgen's Emission Reduction Alberta Demonstration Project

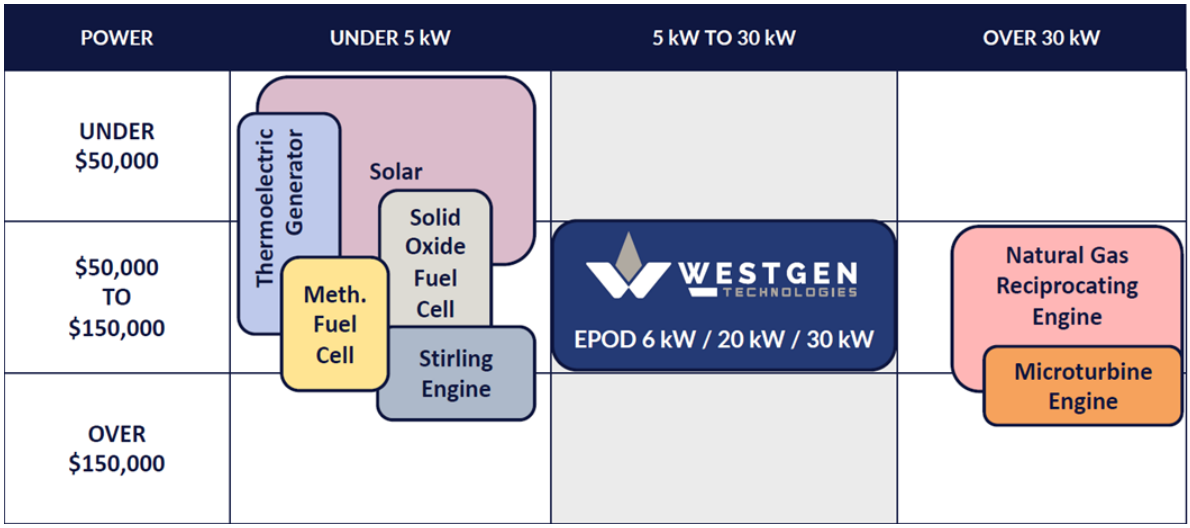
Connor S. O'Shea
President, Westgen Technologies Inc.

The Problem

Methane has a greenhouse gas intensity 25 times greater than CO2. According to the IEA, methane venting from pneumatic devices in the oil and gas industry is responsible for 532.5 million tonnes of CO2e per year, the equivalent of all emissions from 22% of the world's coal fired power plants[1].

Historically, a lack of cost-effective power generation solutions and the resulting high cost to deploy instrument air on remote sites has been one of the root causes of our industry's legacy of venting gas to atmosphere through pneumatic devices.

Traditionally, small industrial internal combustion reciprocating engines have relatively short service intervals, making them unsuitable for use in remote wellsite applications. For example, the typical service interval for a stock generator is 250 hours, which would require an Operator to take their wellsite down for maintenance every ten days. Furthermore, the use of variable fuel gas creates significant additional issues for the engine's lubrication system. By-products from the combustion of "dirty" natural gas, such as well gas that has hydrocarbons heavier than methane and contains additional organic compounds, can foul the lubricating oil of the engine from engine blow by.



The Solution

Westgen developed proprietary technology to overcome the two traditional limitations associated with low power range reciprocating internal combustion engines: maintenance interval and fuel gas quality. Westgen applied their proprietary power generation design to develop the EPOD integrated system. This cost-effective 6, 20, or 30 kW remote power generation solution powers an instrument air compressor using solar power and variable quality gas. The advanced control logic and remote-monitoring capabilities allow for remote operation and collection of data for wellsite analysis and carbon credit generation. EPOD provides an economic solution to supply high pressure air to wellsite pneumatic systems, eliminating methane venting. By eliminating venting, emissions are reduced by around 98%

Demonstration Project

In July 2020, Westgen Technologies Inc. in conjunction with Emissions Reduction Alberta, Sustainable Technology Development Canada, and ten Canadian oil and gas companies undertook a project to develop and demonstrate a solution for eliminating methane venting from pneumatics on legacy wellsites in Alberta. The EPOD-Mini system, based on Westgen's Global Energy Award winning EPOD power generation technology, presents an opportunity for emissions reductions projects with positive economics based on carbon credits and fuel gas expense savings.

The project started with a desktop study of pneumatics inventory data from hundreds of wellsites. Crews were then deployed to the field to measure emissions rates and compare them against estimates. This data was used to inform design conditions to cover a large of variety of wellsite configurations.

The next phase of the project involved deployment of 10 EPOD units equipped with an array of sensors and measurement devices. Real time data was collected from the EPODs on variables such as peak and average air compressor flow rates, compressor run times, and energy usage. Oil sampling and lab analysis was completed to understand performance of the engine while burning variable composition raw well gas.

Westgen applied the learnings from each phase of the project to develop the EPOD-Mini in Q4 2020. In the final phase of the project, 10 EPOD-Minis were deployed to remote wellsites for testing. The units will be closely monitored throughout 2021 to gather learnings and inform product improvements. An application for carbon credits will be pursued based on emission reductions achieved by the project.

Results

The Westgen team will compile data generated through the project to outline the technical and commercial case for instrument air retrofits. Learnings to be shared will include delineation of applicable sites, reliability metrics, cost estimates, and projected economic returns by site type.

Westgen believes that this Alberta case study will have broad applicability and will inspire jurisdictions across the globe to follow Alberta's lead in eliminating this significant environment impact of our industry.

References

1. (IEA Methane Tracker (2020), retrieved from: https://www.iea.org/reports/methane-tracker-2020)