

CLIMATE CHANGE INNOVATION AND TECHNOLOGY FRAMEWORK

Awardee Summary

CCITF PROGRAM	Clean Technology Development
PROJECT TITLE	A Scalable Mobile Methane Sensing System for Emissions Detection, Quantification, and Reduction
SECTOR	Methane Emissions Reduction
ORGANIZATION	University of Calgary
PROJECT LEAD	Chris Hugenholtz
AI PROJECT ADVISOR	Paolo Bomben
GRANT AMOUNT	\$366,000
START DATE	1/1/2019
END DATE	5/31/2022

PROJECT OBJECTIVE: Improve the prototype vehicle-based methane measurement system and perform extensive operational testing and pilot studies.

PROJECT PROFILE: This CCITF CTD project is motivated by demand for new, scalable sensing technologies to efficiently and cost-effectively measure and monitor methane emissions from the oil and gas (O&G) sector. New regulations in Canada are aiming to achieve substantial reductions of methane emissions from the O&G sector by 2025. Measurement is the first step in finding and reducing methane emissions and will play a critical role in tracking progress and determining carbon credits and levies. Given the massive geographic extent and complexity of Western Canada's O&G supply chain, it will be prohibitively expensive to visit and inspect several hundred thousand O&G wells and facilities 1-3 times annually using conventional, close-range sensing technologies. Therefore, we propose an alternative tiered method whereby a large number of O&G assets are quickly screened at a region level for methane emissions using mobile measurement technology. Sites are then triaged for detailed inspection and repair. To enable the tiered method we developed a prototype vehicle-based methane measurement system, and matured the hardware and software to TRL6. Our system was recently recognized by the US Environmental Defense Fund (EDF), Stanford University, and several major US O&G companies, as one of the most promising new technologies for mobile methane detection. In Q2 2018 our system competed in the Stanford / EDF Mobile Monitoring Challenge[2]; we were the only academic team and the only Canadian competitor.

The objective of the CCITF CTD project is to improve the prototype system and advance the technology readiness towards commercialization by performing extensive operational testing and pilot studies. Hardware and software improvements will lead to a more intelligent, robust, and scalable system for application across the upstream O&G supply chain. Testing and pilot studies will follow a prescribed framework to achieve regulatory approval and clearly define the system's limitations, opportunities, and

clarify the full market potential. CCITF funding will be used to cover costs associated with technical personnel. The main outcome will be a regulatory-approved, made-in-Alberta sensing system that supports and accelerates industry and government efforts to reduce methane emissions from the O&G sector. The value proposition is intelligent sensing with embedded analytics that transform mobile multi-sensor measurements into actionable information.

We will achieve the CCITF-desired short-term outcomes by developing and retaining 5 HQP, commercializing the technology and creating a university spin-off company with HQP in Q2 2022, developing new IP, publishing high impact peer-reviewed papers to confirm the scientific underpinning of the technology, transferring hardware IP to a partnering SME, and attracting new investment. Once commercialized our technology will contribute to longer-term outcomes specified in the CCITF, including: a lower carbon footprint from Alberta's O&G sector, growth of Alberta's clean tech cluster, job creation through the university spin-off company, and US market penetration and investment.

GHG EMISSION REDUCTION SUMMARY: