



CLEANTECH CAREER AREA: REDUCING METHANE EMISSIONS

CLEANTECH AND TRANSITIONING CAREERS IN OIL & GAS

Career opportunities across Alberta's oil & gas innovation ecosystem

INTRODUCTION

To address climate change and improve environmental performance across a variety of industries requires innovation and new technologies to be developed quickly.

In this environment there is great opportunity for Alberta's workforce including experienced workers, students and new graduates, career counselors and human resource professionals, training and education institutes, innovators, entrepreneurs and employers and their hiring managers.

There is growing demand for all levels of skills and experience in innovation, technology and 'cleantech' development, as well as for the many supporting or related roles that will help apply these new solutions across many industries.

This document, and seven others in the *Cleantech and Transitioning Careers in Oil and Gas* series, is a guide to developing or adapting skills and experience for meaningful work and careers with direct impact on the environment and the economy, even as our province's resource industries transition to help meet climate challenges.

This series uses examples from Alberta's oil and gas industry. However, cleantech skills and roles are also in demand among agriculture, forestry, manufacturing, transportation and other sectors that are vital to the sustainability of our province.








NEW CAREER AREAS IN REDUCING METHANE EMISSIONS

Working to reduce methane emissions in the oil and gas industry is a significant way new entrants, experienced professionals, researchers and entrepreneurs can bring their passion, values and skills to help address climate change, achieve net-zero targets and improve the lives of Albertans and people around the globe.

CAREER PATHWAYS FOR NOVEL LAND AND WELLSITE REMEDIATION

Universal Attributes Required

Alongside technical skill requirements, workers in cleantech careers (in any industry) require important universal attributes. These are also known as soft skills, attitudes or behaviours.

	AGILITY Adapt to changes, feedback and iterations		SYSTEMS THINKING Ask right questions, visualize work and accommodate ongoing feedback
	STRATEGIC FOCUS For commercial deployment and monetization of ideas		EMOTIONAL INTELLIGENCE Work well with others in a changing environment
	BUSINESS ACUMEN Create value for the business and customers		RELATIONSHIP BUILDING Mutual respect and trust amongst team members and customers
	PERSEVERANCE & CONTINUOUS IMPROVEMENT Incorporate ongoing learning and achieve technical excellence		TRUST & COLLABORATION Work collectively on problems
	COMMITMENT & PASSION Improving the future through "out of the box" and visionary thinking		COMMUNICATIONS SKILLS Share important stories of successes and failures and inspire involvement

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WORKING IN NOVEL LAND AND WELLSITE REMEDIATION

The following key activities are involved when new or improved technologies are developed and applied to reduce methane emissions in the production of oil and gas:

- **Technology deployment and enhancement:** develop and use software tools and mechanical equipment to detect, reduce and measure emissions.
- **Methane detection:** install and operate sensing equipment to conduct compliance and emissions detection surveys, repair leaks and collect and manage data.
- **Emissions mitigation** involving field and plant inspections, well site automation, installing/upgrading emission controls and mechanical systems, capturing fugitive emissions and analyzing operational data.
- **Emissions monitoring, measurement, and verification** including program management of retrofits, operations and maintenance improvements and quality assurance, leak rate quantification, emission calculations and validation for reporting requirements and carbon offsets, and tax preparation.

What is Involved in a Methane Emissions Reduction Career in the Oil and Gas Industry?

Ground-breaking technologies are combined with legacy technologies and oil and gas industry expertise to advance the understanding of fugitive methane emission sources, reduce methane emissions and improve operational efficiency.



Want more details on activities within the Methane Emissions Reduction sector?

Find Novel Land and Wellsite Remediation Key Activities on the Clean Resource Innovation Network (CRIN) website:

WWW.CLEANRESOURCEINNOVATION.COM



KEY SKILLS AND OCCUPATIONS TABLES

The following tables outline the skills, knowledge and occupations within the methane emissions reduction sector that contribute to the enhancement of the oil and gas industry’s environmental performance.

	TECHNOLOGY DEPLOYMENT & ENHANCEMENT	SERVICE AREAS		
		METHANE DETECTION <i>Leak Detection & Repair (LDAR)</i>	EMISSION MITIGATION	EMISSIONS MONITORING, MEASUREMENT AND VERIFICATION
KEY SKILLS AND KNOWLEDGE	<ul style="list-style-type: none"> Technology design procedures, specifications and engineering software/simulation and testing tools Proficient with programming languages for data analyses (R, Python, SQL) and data base management platforms (Hadoop, Apache Spark) Certification or training for specific network environments Effective decision-making and use of digital and analytical tools Proficiency with human to machine interfaces and dashboards Knowledge of industrial gases and analysis Experience with chemical, mechanical and instrumentation systems Knowledge of oil and gas industry operations, processes and challenges Knowledge of industry regulations Understand IP, user rights and patenting Marketing and business development 	<ul style="list-style-type: none"> Technician experience for field surveys Knowledge of processes and equipment to assess emission sites in field and plan environments Training and experience with remote sensing instruments (may include specialized certifications) <ul style="list-style-type: none"> Drones OGI cameras Handheld devices Effective decision-making and use of digital and analytical tools Ability to prioritize where to place devices (compressor seals, vents, tanks) and complete leak repairs Knowledge of hazard assessment and safety procedures Equipment calibration and maintenance Develop written protocols for training and monitoring 	<ul style="list-style-type: none"> Knowledge of oil and gas industry operations, processes and challenges Knowledge and integration of industry regulations, incentive programs and reporting Effective decision-making and use of digital and analytical tools Understanding of instrumentation, mechanical and electrical control technology and work processes Design, install, trouble shoot, repair, maintain and inspect emission mitigation equipment Experience with SCADA, DCS and PLC systems and system integration Experience in plant operations and facilities Process optimization and quality control of processes, systems and procedures Economic analysis of capital and operating costs and revenues for new equipment installations 	<ul style="list-style-type: none"> Knowledge and integration of industry regulations, incentive programs and reporting Effective decision-making and use of digital and analytical tools Knowledge of emissions accounting systems Field operations Understanding of instrumentation, mechanical and electrical systems for calibration and maintenance



		SERVICE AREAS		
KEY OCCUPATIONS	TECHNOLOGY DEPLOYMENT & ENHANCEMENT <ul style="list-style-type: none"> Engineers: process, chemical, automation, software, network Instrumentation technicians Project evaluators Electrical/Instrumentation designers Mechanical designers Software developers and programmers Database analysts and administrators Software programmers End user analysts Lawyers Regulatory specialists Business development/marketing specialists 	METHANE DETECTION <i>Leak Detection & Repair (LDAR)</i> <ul style="list-style-type: none"> Engineers: mechanical, facility/operations, electrical, chemical, petroleum, environmental Technicians: instrumentation, electronic, mechanical OGI camera operators Drone operators Maintenance and repair trades: welders, electricians, insulators, millwrights Field operators/detection technicians Health and safety specialists 	EMISSION MITIGATION <ul style="list-style-type: none"> Health, safety and environmental specialists Field operators/Detection technicians Customer technical support specialists 	EMISSIONS MONITORING, MEASUREMENT AND VERIFICATION <ul style="list-style-type: none"> Engineers: mechanical, facility/operations, electrical, chemical, petroleum, environmental Technicians/technologists: facility, instrumentation, electronic, mechanical Measurement specialists Environmental specialists/Advisors Regulatory specialists Government relations specialists Field production operators/technicians Field operators/Detection technicians Production accountants Tax accountants Software programmers Database analysts and administrators

The **Cleantech and Transitioning Careers in Oil and Gas Series** is the result of a 2021 project funded by the Province of Alberta working in partnership with the Government of Canada, and research conducted by consultants Cheryl Knight and Pat Hufnagel-Smith.

For more information please contact: info@cleanresourceinnovation.com and to view or download documents in the series, visit www.cleanresourceinnovation.com