HR TRENDS AND INSIGHTS

SHIFTING PRIORITIES AND A SHIFTING WORKFORCE

HOW TECHNOLOGY, COSTS AND MARKET DIVERSIFICATION ARE IMPACTING CANADA’S OIL AND GAS WORKFORCE
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There’s no doubt that operating in today’s oil and gas environment is extremely challenging. A confluence of factors, including the Organization of Petroleum Exporting Countries’ (OPEC) decision in November 2014 to maintain higher production levels as well as slowing demand for oil in China, has led to an oversupply of crude worldwide, which has hit Canada’s producers – and the companies that support them – the hardest.

With signs of further cuts in capital spending and more layoffs looming, all eyes are focused on the oil and gas sector. But this isn’t a new challenge, and if there is anything that industry has learned from previous downturns it’s that preparations for recovery can’t be set aside. With the most recent downturn in 2009, the industry experienced an exodus of skilled workers while disenchanted graduates began pursuing other areas of study. So much so, that when a quick and dramatic recovery occurred over the subsequent two years, the industry struggled to find, attract and retain workers with the types of skills that were essential to helping it thrive.

With this in mind, the following report examines the shifts that Canada’s oil and gas industry has witnessed in recent years: from new technologies designed to access harder-to-reach reserves, to cost-management strategies intended to simultaneously improve returns and productivity, to the desire to diversify its business into new and expanded markets.

Along with these three significant business priorities has come the need for new and more intricate skills as well as different occupational requirements. The worker of today is quite different than the one from a decade or more ago. New entrants need to be more familiar with technology of all types. Many of today’s workers require business acumen and negotiating skills. And, with an increased focus on new infrastructure, safety and environmental issues comes the need for more specialists such as those in well abandonment and reclamation, or stakeholder and Aboriginal relations.

Going forward, the analysis presented in this report will be used in the development of PetroLMI labour market information and tools. PetroLMI’s goal is to ensure that the information produced for workforce and career planning continues to accurately reflect the industry’s changing business environment.

Canada’s oil and gas industry has learned from its past that the only way to address the human resources challenges of the future is by preparing for them now.

Carol Howes
Vice President,
Communications and PetroLMI
This report examines key shifts in skill and knowledge requirements and new and emerging occupations within Canada’s petroleum industry due to changing technologies and business priorities. This research will help to inform workforce planning and training requirements. In addition, the research will play a large part in the development of upcoming PetroLMI products and tools.

Insights presented in this report result from a series of interviews with industry representatives together with the continuous monitoring of the industry by the Petroleum Labour Market Information (PetroLMI) Division of Enform, as well as additional secondary research.

With the rapid pace of technological innovation and a changing political, regulatory and socio-economic environment, Canada’s petroleum industry is increasingly in need of a more skilled and knowledgeable workforce. While worker demand is ultimately driven by economic cycles, it is the growing complexity of the oil and gas business, along with the pressures to remain profitable and competitive, that determines the skills and knowledge required by its workforce.

This report examines the impacts of these priorities on the industry’s overall workforce and then provides a more in-depth analysis of these changes on the industry’s sub-sectors (i.e., conventional/unconventional exploration and production [E&P], oil sands, oil and gas services, and midstream and pipelines).

Three industry priorities were identified as driving the shifts in workforce requirements:
1. Accessing technically complex unconventional reserves
2. Balancing performance and cost management to achieve profitability
3. Achieving market diversification to grow the business
INDUSTRY-WIDE BUSINESS PRIORITIES AND WORKFORCE SHIFTS

The following section examines three inter-related business priorities that account for the most significant shifts in workforce, skill and knowledge requirements.

1. ACCESSING TECHNICALLY COMPLEX UNCONVENTIONAL RESERVES

In recent years, the majority of new oil and gas production in Canada has come from reserves located in more remote locations, such as the oil sands in northern Alberta or tight oil and natural gas plays in northeastern British Columbia. While the application of new technologies to tap into these reserves has made many of these resources commercially viable, it has also altered the types of equipment, materials and services that are required to carry out the work. As a result, the types of associated skills and knowledge have advanced. Higher levels of reading, numeracy, communications and problem-solving skills are required to perform new tasks.

These difficult-to-access, remote unconventional reserves are also more costly to develop, with processing and transportation expenses, equipment, materials and services increasing overall industry capital and operating costs.

WHAT MAKES AN UNCONVENTIONAL RESERVOIR?

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Increasing technology requirements

Increasing reservoir quality
In order to contain capital and operating costs, the petroleum industry is applying technology, along with other measures to streamline operational processes and ensure the right skills are in the right place at the right time.

Workers play a key role in balancing performance and profitability for the industry. They are now expected to have a firm understanding of the cost implications of their decisions and actions in the increasingly complex regulatory and socio-economic environment in which they are working. Supply chain management professionals, for instance, play an increasingly important role in minimizing downtime on capital projects and operations by moving equipment, materials and services in the most efficient manner possible. To address this need, occupations that deal with people logistics have emerged – those who coordinate and manage various aspects of rotational work and the associated travel and accommodation needs of the workers. Additionally, a focus on asset management, equipment reliability, and predictive and preventative maintenance roles has emerged to help achieve continuous expansion of these unconventional resources. These roles are also helping to enhance performance and effectively manage costs.

“Once the goal was to generate barrels at any cost. Now it’s about generating profits, not production. The cultural shift means that companies are now open to shutting down any unprofitable well.”

MANAGER, INVESTOR RELATIONS

TODAY’S OIL AND GAS WORKER NEEDS TO

- Be comfortable with technology
- Have business acumen
- Be innovative
- Be able to negotiate successfully
- Strive for continuous improvement
- Be highly skilled at reading, numeracy, communicating and problem solving
- Plan and execute projects of all sizes
- Be aware of the regulatory and compliance implications of new and planned operations
- Understand the cost implications associated with their actions
The oil and gas industry’s need for a more skilled and knowledgeable workforce has in turn elevated the role and skills of its human resources professionals:

- Workforce planning has become an increasingly sophisticated function with the need for more informed and data-driven decision-making.
- Increasing productivity has become a higher priority area; the need to obtain the most from the workers is driving the need for more training and up-skilling.
- The focus on retaining well-trained and experienced workers has intensified.
- Leaders and managers are driving more training and mentoring initiatives.
- More innovative workforce attraction strategies are required (e.g., rotational work arrangements).
- Managing a contingent workforce has become necessary to fill the gaps in experience and expertise, as well as the ability to deploy appropriate resources for specific project phases and market conditions.

Worldwide, oil and gas production is on the rise due to the ability to access unconventional resources. The United States has boosted its production to unprecedented levels and, accordingly, reduced its reliance on Canada’s petroleum resources. For Canada, then, accessing new offshore markets is a priority.

Market diversification can only be achieved, however, through ongoing investment in large, capital-intensive infrastructure projects, such as liquefied natural gas (LNG) facilities and new oil and gas pipelines. The availability of a skilled construction and operations workforce, therefore, is an important consideration in corporate investment decisions. In addition, there is an increasing emphasis on teams of workers with the knowledge and skills required to handle complex technical, commercial and regulatory planning.

With the necessity to construct new infrastructure also comes the requirement to gather broader public support from communities that have not historically participated in oil and gas development. Consequently, stakeholder and Aboriginal relations have become even more critical.

As Canada’s petroleum industry awaits the addition of pipeline capacity, it has intensified its use of rail tankers and barges to transport product to market. This, in turn, has resulted in the need for occupations that support these alternate forms of transportation, such as rail terminal workers and commercial/marketing professionals tasked with selecting the most effective method of transportation.

“Market access – by all means, in all directions – remains critically important to improve the health, wealth and quality of life of all Canadians.”

TIM MACMILLAN
PRESIDENT, CAPP
CONTEXT MAGAZINE
FEBRUARY 2015

HR’S STRATEGIC ROLE IN THE INDUSTRY’S CHANGING BUSINESS PRIORITIES

The oil and gas industry’s need for a more skilled and knowledgeable workforce has in turn elevated the role and skills of its human resources professionals:

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WORKFORCE SHIFTS BY SUB-SECTOR

The following section examines the specific workforce impacts for each sub-sector, as each has a different role in the oil and gas value chain.

CONVENTIONAL AND UNCONVENTIONAL EXPLORATION AND PRODUCTION (E&P)

Unlike unconventional resources, conventional oil or natural gas comes from geological formations that are relatively straightforward to develop. Unconventional resources are trapped in reservoirs with low permeability and are referred to as tight. The technical complexities of tapping into this tight rock are driving the need for more specialized sector knowledge and skills across all phases of a project, from drilling, completions, development and exploitation to production and processing. Regardless of the differences, both conventional and unconventional E&P are relying more heavily on engineers for their technical knowledge, whether they be in-house or contract workers.

Applying more innovative technologies from the wellhead through to the production site also means more technologists are required to do fieldwork – a marked contrast from the previous practice of hiring field operators with mechanical aptitude and providing on-the-job training.

With the complex array of equipment and services required to drill and develop these unconventional resources, E&P companies have also shifted to centralizing their supply chain management. This, in turn, has increased the demand for supply chain and logistics specialists who can help to realize economies of scale throughout their chain of activities.

Though still in the early-stage planning and development of a new liquefied natural gas (LNG) export sub-sector in Canada, this sector will have an increasing requirement for project and construction managers, project engineers and regulatory professionals, as well as the expertise of expatriates who have planned and developed LNG projects in other parts of the world.

“The highly specialized nature of the workforce means many local residents in regions without substantial existing unconventional oil and gas activity initially do not have the skills necessary to compete for certain jobs.”

SHIFTS IN OCCUPATIONS AND SKILLS IN THE CONVENTIONAL/ UNCONVENTIONAL E&P SECTOR:

- A more complex, technical environment is creating a heavier reliance on engineers.
- Field technologists are replacing workers that had a mechanical aptitude supplemented with on-the-job training.
- More emphasis is being placed on occupations in supply chain management in order to drive economies of scale throughout the chain of E&P activities.
- With the development of unconventional resources, an oil and gas workforce presence is being established in new locations (e.g., Vancouver and northwestern B.C.).
- A redeployment of workers and an increase in the use of contractors are addressing skills shortages (e.g., engineers, regulatory and stakeholder relations).
OIL SANDS

The expansion of in-situ oil sands production in northern Alberta has created significant workforce shifts in industry, due to the increased use of steam-assisted gravity drainage (SAGD) technologies to access these reserves. These new technologies have accelerated demand for occupations, such as power engineers, reservoir engineers and well pad operators, in addition to expanding the need for occupations that are associated with more traditional mining production, such as heavy equipment operators and heavy duty mechanics.

Oil sands companies in particular are focused on leveraging innovative technologies and a highly skilled workforce to achieve cost savings, production increases and productivity gains.

The importance of containing costs in an operating environment that is subject to rigorous regulatory oversight and changing socio-economic impacts has influenced the competencies and occupations required by these oil sands operators. Similarly, regulatory professionals and those who have the ability to manage sophisticated community and Aboriginal relationships are playing a key role through the full lifecycle of these projects.

Previously, external construction management firms, otherwise known as EPCs (engineering, procurement and construction), almost exclusively handled the management of oil sands expansion and construction projects. Increasingly, these functions are managed in-house to gain more control over the planning and execution of projects and to improve project quality, costs and schedules. As a result, project and construction managers, project engineers, and supply chain and materials management professionals are working directly for oil sands operators. Experienced commissioning and start-up operators are also required to bring on new operations in a timely and effective manner.

Oil sands operators rely heavily on a contingent workforce to assist with ongoing operations and maintenance. Increasingly these companies are assessing if positions should be in-house rather than contracted, in order to create cost savings.
Market access and diversification is critical to oil sands growth and profitability. And it is oil sands operators, in particular, who benefit the most from an internal capacity to deliver their product to market. These companies are hiring commercial and marketing professionals to negotiate and coordinate the shipment of products on expanded transportation modes, including pipeline, rail and barge. Some of these companies have even built rail terminals to get product to market.

“With the lack of pipelines, we have had to take control of our destiny to get our product to refineries and storage and drive [the] best net backs against WTI [West Texas Intermediate] pricing.”

OIL SANDS EXECUTIVE
NOVEMBER 2014

**SHIFTS IN OCCUPATIONS AND SKILLS IN THE OIL SANDS SECTOR:**

- Demand for occupations such as power engineers, reservoir engineers and well pad operators has accelerated to support in-situ oil sands production.
- Heavy equipment operators and heavy duty mechanics remain in demand at oil sands mining operations.
- Regulatory, community and Aboriginal stakeholder relations professionals are required to manage sophisticated and complex issues.
- Project/construction managers, project engineers, supply chain and materials management professional positions are moving in-house.
- Experienced commissioning and start-up operators are required to bring on new operations in a timely and effective manner.
- Predictive and preventative maintenance is critical to decrease unplanned outages.
- Commercial and marketing professionals are needed to negotiate and coordinate the shipment of products on expanded transportation modes including pipeline, rail and barge.
- Companies are evaluating the cost of contingent, contracted workers compared to bringing resources in-house.
OIL AND GAS SERVICES

As the service provider to exploration and production companies, the oil and gas services sector has experienced significant workforce shifts in recent years due to the growing application of more specialized equipment.

The extensive use of horizontal drilling and hydraulic fracturing (fracking) to tap into unconventional reserves has resulted in a significant impact not only on the types of equipment and services required, but also on the skill levels and occupations. Unconventional drilling and completions operations, for instance, require 45 or more suppliers and up to 300 workers per well compared to 75 workers for a conventional well, according to a study commissioned by the Petroleum Services Association of Canada (PSAC).1

To support the industry, service companies have constructed larger and more technically advanced drilling rigs in order to drill deeper, for greater distances and in more complex and remote reserves. The design, construction and ongoing maintenance of these rigs require mechanical engineers and technologists, instrumentation engineers and technologists, and a variety of trades, including welders, heavy duty technicians, electronics/instrumentation technicians and electricians. They also require drilling crews who are comfortable working with changing technologies.

Likewise, the types of activities and equipment required to complete an unconventional well and prepare it for production have created new occupations. Fracking operators, for instance, mix liquids and materials and operate the equipment used in the fracking process. Class 1 and Class 3 vehicle drivers are needed to haul equipment and materials to a wellsite. Heavy duty technicians and electronics/instrumentation technicians play a critical role in maintaining the trucks and equipment to minimize downtime due to breakdowns.

Efforts to increase the reuse and recycling of water used during drilling, fracking and other well completion activities have increased the number of water and waste management facilities and, accordingly, the demand for plant operators.

Purchasers, warehouse workers and dispatchers also play critical logistical roles in ensuring the right equipment, materials and personnel are on site when required.

Many oil and gas service companies have increasingly adopted the use of rotational work schedules and offer transportation arrangements that are more attractive to workers who are not local, enabling these companies to tap into alternate labour supply pools from across Canada. Consequently, driving licenses and personal transportation are a growing necessity just to get to a work site or transportation hub, even if the actual work does not require it.

Meanwhile, the growth in unconventional drilling has resulted in a reduction in some traditional oil and gas services. The use of coil tubing in unconventional drilling has decreased the need for wireline and slick line services, for example, while the demand for seismic work has decreased with a decline in industry exploration activities.

“Canada’s oil and gas industry has undergone more change in the last 5–6 years than it did in the previous 25 years.”

DAVID YAGER
NATIONAL LEADER,
OILFIELD SERVICES
MNP

“Technological shifts are prevalent in the oil and gas services sector. From e-rigs that run on sophisticated computer systems to truck drivers using handheld devices to complete trip reports.”

PARTICIPANT AT PSAC CONSULTATION SESSION,
FEBRUARY 11, 2015

With the development of horizontal drilling and hydraulic fracturing activities, employment per well has increased substantially:
- Service companies provide 45+ suppliers per well and 240–300 workers per well.

Workers must be both technically and mechanically inclined.

There is an increased need for:
- Class 1 and Class 3 drivers
- Heavy duty technicians
- Frack operators
- Health and safety personnel
- Fire/shower services
- Purchasing, warehousing, dispatchers
- Facility operators

Technical sales/marketing and HR sophistication is required.
- Skilled marketing and sales personnel need to establish relationships at the customer’s head office.

To improve employee retention and turnover management, oil and gas services companies report offering:
- Incentives and/or year-round benefits to help employees manage the cyclical nature of the industry and encourage them to return following spring break-up or other short-term downturns.
- Redeployment to different service lines so employees can maintain full-time employment. [This is primarily available at service sector companies that have diversified services.]
- Bridging periods of layoffs to determine years of service for benefits purpose.
- Choice of rotations to better accommodate personal/family situations.

**SHIFTS IN OCCUPATIONS AND SKILLS IN THE OIL AND GAS SERVICES SECTOR:**

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Technical sales/marketing and HR sophistication is required.
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“Overall, Strad’s diversification across geographies in Canada and the U.S., exposure to both crude oil and natural gas activity, product line diversification, blue chip and well capitalized customer base, and exposure to energy infrastructure projects collectively, will serve to insulate the business to some degree from the decline in drilling activity levels.”

STRAD ENERGY, Q4 2014 MD&A REPORT
The oil and gas services sector participates in projects that are being proposed or underway to diversify Canada’s energy markets, and as a result are providing services such as environmental services, right-of-way clearing and construction of access roads, and land surveying. Once projects are in the construction phase, the services sector is also called on to provide camps for rotational workers, hauling equipment and some construction services. This has created a variety of additional new jobs in the sector.

In today’s environment, the oil and gas services sector requires a level of investment and sophistication that is difficult for many small service companies to manage, resulting in an expansion of larger, more sophisticated companies that provide services to industries well beyond the oil and gas industry.
The midstream sector, which includes processing, storing, transporting and marketing of oil, natural gas and natural gas liquids, has evolved to provide niche services to the petroleum industry.

Increased production from unconventional reserves and demand for natural gas liquids and diluent recovery are driving the midstream sector to invest heavily in building, expanding and retrofitting processing plants. New and retrofitted plants increase the need to both hire and train plant operators who have plant and process specific knowledge and skills.

Meanwhile, an unprecedented capital investment in rail terminals, new and retrofitted plants and pipelines to transport oil and natural gas has also resulted in a greater demand for planning and executing large capital projects and, with that, the need to hire project and construction managers, design and project engineers, as well as supply chain and materials management specialists. Likewise, the workforce hired for these major projects are largely made up of contractors to allow companies to ramp-up and gear down as required by the project lifecycle.

For both midstream companies and pipeline operators, many of the priorities associated with the balancing of costs and performance are related to their role in achieving market access. Pipeline companies’ current operations and planned construction projects are under increased public and regulatory examination. Although these companies have always employed professionals specializing in regulatory and compliance fields and Aboriginal and stakeholder relations, these roles have taken on more significance and become higher in profile. In addition, with aging pipeline infrastructure comes a growing demand for pipeline integrity specialists.

• Process operators are needed to address the increase in processing product from unconventional reserves.
• The deployment of a contractor/contingent workforce manages activity ramp-up and gear down.
• Significant growth is occurring in major project groups: project and construction managers, design and project engineers, and supply chain, business development and commercial roles.
• The need for more regulatory and compliance roles and stakeholder, community and Aboriginal relations professionals is due to the increased regulatory requirements and public scrutiny of current and planned pipeline projects.
• With the pipeline sector’s aging infrastructure, there has been growing demand for pipeline integrity specialists.
ON THE HORIZON: TRENDS IMPACTING CANADA’S OIL AND GAS WORKFORCE

The following section provides a glimpse into trends that will likely impact workforce and human resources planning as Canada’s oil and gas industry aims to further increase its competitiveness.

As the oil and gas industry continues to focus on productivity gains and finding innovative, environmentally friendly solutions to access Canada’s unconventional reserves, further technological enhancements are expected to impact the number of workers in some service-sector occupations. This is especially true in low-price environments, where technology is adopted in efforts to improve operational efficiencies and drive down costs. An increased use of measurement-while-drilling and logging-while-drilling tools, which collect data during the drilling process, could improve drilling accuracy. Microseismic monitoring of the hydraulic fracturing process, which uses sensors to collect and analyze data to map the impacts of fracturing, has the potential to optimize production and minimize the number of wells and fractures required. These types of technology will drive the need for workers with backgrounds in field operations, geophysics, geology, and reservoir and completions engineering. Improved logistics and material and equipment management will also create further efficiencies by reducing wait times.

Conversely, other technologies are expected to decrease the demand for workers in some occupations. Walking rigs have the ability to travel under their own power on pneumatic legs and are used for drilling a cluster of wells within a small area. This is also known as pad drilling. The use of walking rigs cuts time and costs and decreases the need for workers to dismantle and truck the rig between locations.

Water sourcing and usage will continue to be a focus for improvements, with a particular emphasis on site recycling technologies that decrease the need to truck water in. This will in turn decrease road traffic and repairs while improving safety.

“The drop in oil prices is an ‘opportunity’ for every part of the industry to cut costs and eliminate inefficiencies that were allowed to creep in when business was booming.”

STEVE LAUT
PRESIDENT, CNRL
THE GLOBE AND MAIL
FEBRUARY 19, 2015
Meanwhile, construction of new infrastructure will increase the need for predictive, preventative and turnaround maintenance, with aging infrastructure driving further demand for asset integrity and reliability specialists.

With the increased focus on environmental performance comes increased regulatory requirements of services related to well abandonment and reclamation. Companies are looking at ways to transition away from hiring environmental and safety specialists as “compliance police” and moving towards greater accountability for environmental and safety matters with those in leadership and management.

Although the deployment of a contingent workforce is expected to continue, workforce planners in many E&P, oil sands and pipeline companies are conducting cost/benefit analyses of this workforce and looking to a more coordinated, strategic approach to their management going forward.

The development of LNG facilities and oil and gas pipelines in Canada is expected to put pressure on construction labour and redefine the industry’s relationship with Aboriginal and other communities. This will drive the need for skilled negotiations on equity partnerships and benefits. Access to offshore markets will require increased offshore environmental monitoring and emergency response services on Canada’s coastlines.

Lastly, pipeline companies, which once focused on the delivery of one type of product, are diversifying. Because of this, different technologies and skill sets are required from workers who traditionally worked with only one commodity. While oil and liquids pipelines require pump stations, natural gas transmission requires compressor stations. Additionally, natural gas in a pipeline remains uniform, whereas oil and liquids in pipelines have different specifications making unplanned outages even more disruptive. Specific training and knowledge will be expected of schedulers, pipeline operators, maintenance/outage planners and commercial/business specialists.

“It’s not fantasy,’ Suncor’s chief financial officer Alister Cowan told investors at an RBC Capital Markets conference in New York last week. He said the company is working to replace its fleet of heavy haulers with automated trucks ‘by the end of the decade.’ The move to driverless trucks comes as Suncor and its competitors in the oilsands look for opportunities to cut costs and boost productivity, an effort that has intensified amid the year-long plunge in oil prices.”

Geoffrey Morgan
Financial Post
June 8, 2015

Downward economic cycles typically drive Canada’s oil and gas industry to explore opportunities that reset capital and operating expenditures. These resets may have long-lasting impacts on the industry’s workforce and human resources planning and programs, by:

- Standardizing training across sectors through third-party providers, rather than individual company initiatives.
- Further compensation rollbacks at all company levels, including executives and boards.
- Revisiting how and when work is done.
- Limiting the types of occupations offered rotational schedules.
Navigating the complex landscape of Canada's oil and gas industry requires a heightened level of sophistication and new array of skills and knowledge for workers. Recognizing the impacts that new technologies, financial constraints and market competition have on this industry will help workforce planners, governments and education institutions alike plan for a stable and fiscally responsible future – one that attracts investment nationally and internationally and one that addresses the social accountabilities that have been placed upon it.

Photo credit: Encana Corporation
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- Canadian Natural Resources Ltd.
- Energy Services BC
- Keyera Corp.
- MEG Energy Corp.
- MNP LLP
- Nexen Energy ULC.
- Oil Sands Community Alliance (OSCA)
- Precision Drilling Corporation
- Savanna Energy Services Corporation
- Shell Canada
- Tervita Corp.
- TransCanada Corporation

In addition, we would like to thank other organizations that contributed to this report, but are not listed here by name.

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The Petroleum Labour Market Information (PetroLMI) Division of Enform is a leading resource for labour market information and trends in the Canadian petroleum industry.

PetroLMI specializes in providing petroleum labour market data, analysis and insights, as well as occupation profiles and other resources for workforce and career planning.

With the support of industry, PetroLMI has developed the Careers in Oil + Gas website to provide its resources and key industry information to those in workforce planning or who are planning and pursuing careers in the oil and gas industry.

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