

How do Industrial GHG Reduction Efforts Affect Demand for Skilled Labour?

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Skilled labour shortages have already been identified in several important industrial sectors, including electricity generation and oil and gas. Industrial greenhouse gas mitigation efforts on a scale sufficient to make progress toward meeting Canada's emission targets will boost skilled labour demand substantially, exacerbating existing skill shortages.

Study Overview

This Research Brief describes how Canadian greenhouse gas (GHG) emission constraints are likely to impact industrial demand for skilled labour. Using the CIMS integrated energy-economy model, Navius forecasted how various industrial sectors would invest in measures to reduce the GHG emissions associated with their use of fossil fuels, if binding Canadian GHG targets were in place. The primary measures investigated were the implementation of carbon capture and storage (CCS) by the electricity, oil and gas, petroleum refining, and iron and steel sectors, and the use of cogeneration by the oil sands sector. We then estimated the demand for skilled labour associated with these investments, and identified the types of labour that would be required. Our focus was on the demand for workers with university, college, or technical institute training, who are referred to as Highly Qualified Personnel (HQP).

The full report, describing our methods and results in detail, is available at www.naviusresearch.com/data/pages/labourbrief.php.

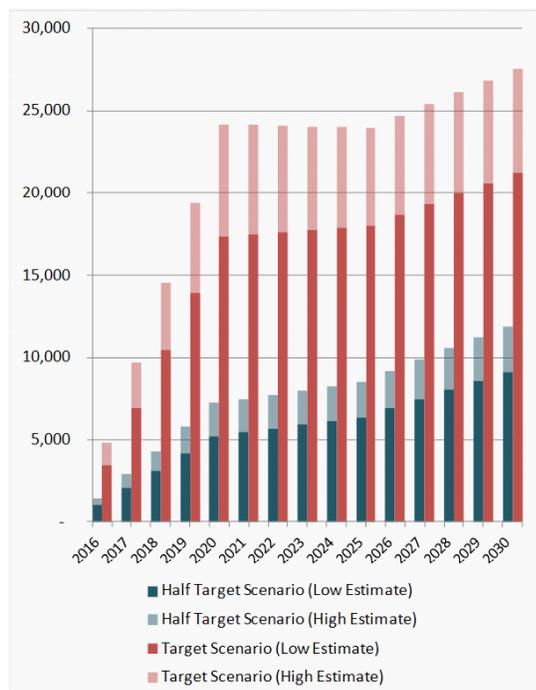
How much additional skilled labour would be required?

We examined two GHG emission target scenarios in this analysis:

1. Target: Emissions are constrained in order to achieve Canada's stated long-term GHG emission reduction target (60-70% below 2006 emissions levels by 2050).
2. Half Target: Half the level of abatement in the Target scenario is achieved.

Figure 1 shows the total demand for HQP under each scenario, compared to a Baseline scenario in which no new GHG emission constraints are implemented. The high and low estimates reflect uncertainty about the HQP share of total additional labour demand.

Figure 1: Total additional full-time equivalent HQP positions required, relative to Baseline scenario



In the Half Target scenario, approximately 9,000 to 12,000 additional full-time equivalent HQP positions will be required in 2030, while approximately 21,000 to 27,500 additional full-time equivalent positions will be required in the Target scenario. The vast majority of this HQP demand is associated with the implementation of CCS by the electricity generation and oil sands sectors. Each \$1 million of industrial investment spending produces between 3.0 and 4.4 person-years of HQP demand on average, while each \$1 million of operations and maintenance spending produces an average of 5.9 to 6.6 person-years of HQP demand.

Between 2016 and 2030, demand for HQP increases by an average of approximately 800 full-time equivalent positions per year in the Half Target scenario and approximately 1,800 full-time equivalent positions per year in the Target scenario, relative to the Baseline scenario. To put this in perspective, the oil sands sector currently employs a total of approximately 22,000 people, and the electricity sector employs approximately 100,000 people.

These estimates include directly employed and contracted labour, but not indirect labour impacts associated with GHG reduction efforts (such as demand for legal and accounting services). We did not assess the interaction between labour demand, wages, and labour supply in this study, or identify if labour demand elsewhere in the economy may be displaced by industrial GHG reduction efforts. These interactions could be examined in the future using a general equilibrium approach.

What types of labour will be demanded?

Our interviews with industry found broad consensus that implementing CCS will create significant demand for engineering, trades, and construction skill sets. In general, specialized CCS-related skill sets are not likely to be required, since industry already has significant experience with capturing and transporting CO₂ from other applications. However, the storage stage of CCS will require geologists, geophysicists and hydrogeologists with an understanding of CO₂ subsurface characteristics, in order to assess the suitability of potential storage sites and monitor storage performance.

Professions and areas of expertise that industry identified as important to CCS development include:

- Construction trades;
- Project managers;
- Engineers and laboratory technicians;
- Process operators; and
- Maintenance trades (Electricians, Instrument and Electronic Technicians, Mechanics).

Implementing CCS will also increase demand for several types of HQP that are already in short supply, including:

- Engineering and construction management;
- Welding and instrumentation;
- Construction trades; and
- Process operators (particularly those with 2nd class or higher Power Engineering certificates).

What are the implications?

HQP skill shortages have already been identified in the petroleum and electricity sectors. Growing demand for energy and materials in the coming decades will likely drive substantial new investment and skilled labour demand in these sectors. The Petroleum Human Resources Council of Canada expects 16,000 new jobs to be created in the oil sands alone by 2022 – an increase of 71% from 2012 levels.

Our HQP demand estimates are above and beyond these business as usual labour demands. As a result, the total demand for HQP over the coming decades will be substantial and may create a situation where the supply of adequate HQP becomes a limiting factor for industry. Additionally, many of the types of expertise that will be required to implement GHG reduction measures are already in short supply, and so emission constraints could exacerbate existing skill shortages. Academic institutions, industry, and government will need to work together to ensure that sufficient trained professionals are graduating in these areas to support economic growth and achieve Canada's GHG reduction objectives. Since time is required to train new HQP, it is important for government to provide a clear policy signal and adequate notice before implementing GHG reduction policies.

This study was commissioned and funded by Carbon Management Canada: www.cmc-nce.ca.

The full study can be downloaded at www.naviusresearch.com/data/pages/labourbrief.php.

For questions about this research or to inquire about custom analyses, please contact Jacqueline Sharp at Jacqueline@NaviusResearch.com.