The Perfect Storm, Part II

Hennie F. PRINSLOO
Consulting Engineer
North Vancouver, British Columbia, Canada
Phone 604 817 7237
Hennie@vasbyt.ca

Abstract

In the next decade the demographic shift in the Canadian labour force will result in a skills shortage of crisis proportions. The number of potential workers to replace those retiring indicate a potential shortfall in the order of 750,000.

This paper will describe the crisis, discuss a few examples and propose a three-pronged approach to mitigate the coming "perfect Storm".

Keywords: Labour, shortage, training, skills, apprenticeship

1 Introduction

In 2013, the “Perfect Storm” presentation at the IPEIA addressed the demographic shift and skill imbalance situation facing the energy industry. That presentation focused primarily on the energy industry – Part II takes a wider view:

- What does the future manpower resource picture look like in Canada as a whole?
- How is that going to affect the energy in Western Canada?

2 The present resource situation:

The so-called “population bubble” of the “baby boomers” – those born in the decade after WWII are now reaching retirement age. Of the total Canadian workforce of 19.5 million\(^1\), 3.6 million are in the age group of 55 and older\(^2\) (representing those who will likely be retiring in the next decade), compared to 2.8 million potential workers in the 15 to 24 year bracket (those who should be entering the workforce in the same period). The age breakdown is not available for the individual provinces, but by assuming the same ratio of age demographic (age bracket/employed workforce), the situation in the western provinces is illustrated in Table 1.

<table>
<thead>
<tr>
<th>Province</th>
<th>Population (2014)</th>
<th>Employed Workforce</th>
<th>Workforce, Age 55 and over</th>
<th>Potential Workforce, Age 15 to 14</th>
</tr>
</thead>
<tbody>
<tr>
<td>Canada</td>
<td>29,070,000</td>
<td>18,110,000</td>
<td>3,591,000</td>
<td>2,838,000</td>
</tr>
<tr>
<td>Alberta</td>
<td>3,288,000</td>
<td>2,308,000</td>
<td>458,000</td>
<td>361,000</td>
</tr>
<tr>
<td>Saskatchewan</td>
<td>844,000</td>
<td>570,000</td>
<td>113,000</td>
<td>89,000</td>
</tr>
<tr>
<td>British</td>
<td>3,907,000</td>
<td>2,348,000</td>
<td>463,000</td>
<td>369,000</td>
</tr>
</tbody>
</table>
The StatsCan data for the country as a whole shows a potential workforce shortfall of some 750,000 people across all industries over the next decade – just to replace retirees and not allowing for any industrial growth.

In the energy industries this shortfall may proportionally be even higher. Industry studies\(^3\) forecast that some 98,000 new workers will be needed in construction, operations and maintenance jobs in the energy industry alone by 2023. This number refers to new workers to address growth, not the replacement of retirees.

The Construction Sector Council (CSC), who represents about 650,000 workers in 15 trades, estimates\(^4\) the Alberta oil sands and gas developments alone will generate a requirement for 180,000 new construction personnel by 2018. Add to that some 210,000 replacement workers for those retiring and a need in the construction industry in Alberta alone of some 390,000 workers is identified. According to the article, there may be 170,000 workers entering the workforce over the same period – leaving a shortfall of 200,000 people – in the construction sector in the western Provinces alone.

Alberta has seen a net migration gain of 50,000 people (on average) per year for several years now. Making provision for many of these being made up of younger families, it may mean a gain of about 15,000 to 20,000 to the workforce. This migration pattern cannot be relied on to continue as the energy industry in the Maritimes gain momentum and the refurbishment projects in the nuclear industry in Ontario picks up. The skilled workers needed in these industries must be recruited from the same resource pool Alberta, Saskatchewan and British Columbia are trying to tap.

Ontario Power Generation (OPG) will be refurbishing four units of the Darlington\(^4\) nuclear generating station over the period 2016 to 2025. Bruce Power plan to refurbish six units of the Bruce nuclear station over the same period of 2016 to 2031. Each of these refurbishments require around 2000 skilled workers\(^5\) per unit – those directly involved. Given the overlap between Darlington and Bruce, some 4,000 skilled workers will be directly tied up on these projects alone. Should one consider the supporting industries to these projects, the required number of workers is probably closer to 10,000.

In 2013, the Office of the Premier of British Columbia issued a press release\(^12\) that estimated the number of workers required to build, operate and maintain the Natural Gas (NGL) projects being envisaged to be in the order of 130,000. Several of these projects are forecast to become reality over the next decade.

<table>
<thead>
<tr>
<th>Province</th>
<th>Population (2014)</th>
<th>Employed Workforce</th>
<th>Workforce, Age 55 and over</th>
<th>Potential Workforce, Age 15 to 14</th>
</tr>
</thead>
<tbody>
<tr>
<td>Columbia</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
The aforegoing speaks to the general, overall picture. A look at two specific disciplines provides a closer view:

3.1 The situation in the engineering field:

The 2012 report on trends in engineering enrollment reports a steady growth in undergraduate enrollment from 2008 to 2012. Moreover, the proportion of female students is edging upwards towards 20% of total – an encouraging sign but one that also sows there is a major resource pool going untapped yet.

But even so – the total enrollment of undergraduate engineering students in the whole country reached only 70,000 people in 2012. When they graduate in 4 to 5 years’ time, the demand for engineers is bound to be outstripping the supply by a substantial margin.

The engineers required to replace the retirees over the next decade, however, would need to come from those that graduated 15 to 20 years ago – when enrollment was way down and those who graduated did not find work in the energy industry because the oil price was in the $15 per barrel range.

Chart 1. Undergraduate Engineering Enrollment
The proportion of undergraduate visa students (i.e. foreign students) has remained fairly constant at around 13% - no data was found to indicate how many of these students remain in Canada after graduation. If one were to assume (for lack of other, reliable data) that they all return to their countries of origin, then the number of graduate engineers suddenly does not look so promising anymore.

The number of immigrants in the engineering profession has decreased over the last number of years. After peaking at 16,000 in 2002, there has been a precipitous drop since then (refer to Chart 3, below).

---

*FTEs are reported since 2006 and full-time students only prior to 2006.

---

1 The Perfect Storm, IPEIA Conference 2013, Banff AB, 2013
3.2 The situation in the welding trades:

There are currently 10,300 welders in all industry sectors in BC—a number that would probably need to treble to address the ship-building projects, the LNG projects and the associated infrastructure, including pipelines and the like. It is forecast\(^{11}\) that, if just half the proposed LNG plants with supporting infrastructure is built in BC, there will be a need of 39,000 skilled workers.

Over the last 5 years, 4048 persons obtained a pressure welder certificate in Alberta, of which 1171 were people who transferred from other Canadian jurisdictions to Alberta. Of the 4048 certificates, 1821 were “C” certificates – which are typically issued to temporary foreign workers and can also be issued to final year apprentices.

In the 5 years 2008 to 2012, the numbers of welding apprentices enrolling in apprenticeships across Canada have remained more or less steady at around 17,000 per annum, stepping up to almost 19,000 in 2012. This is an encouraging trend if it were to continue, but it is nowhere near adequate to maintain the needed skills pool.

Add to that the welders that will be needed in Ontario for the nuclear refurbishment and in the Maritimes for energy projects, shipbuilding and other infrastructure projects and the total number of available welders will still be compare that to the young welders coming onto the scene – the picture looks bleak.

The picture in the supply of skills in other trades is similar.

4 The issues facing the industry
4.1 Firstly: The shortfall in manpower\(^2\) – the body count.

As is evident from the data presented up to now, there is a looming “Perfect Storm” heading for not only the energy industry over the next decade, but for the entire country. With people retiring, stepping out of the workforce or dying, there is going to be an increase in the shortage of manpower. This shortage will be felt over all sectors of the economy, from arborists to zoo keepers.

Figure 2\(^7\), below, indicates that the energy industry (as we know it in Western Canada) employs less than 2% of the total workforce in the country. The statistic is 3 years old, but the order of magnitude will not have changed significantly over this period. The highest employment levels are in the retail trades – where the lowest skills levels are required.

![Chart 4. Employed Population Aged 15 and Older](image)

Although the energy industry represents a small part of the overall employment picture, it is a sector in which high skill levels are required. Attracting the young people with the necessary talent, tenacity and work ethic to become the next generation of energy professionals is the task before the industry, and the industry is competing with a far bigger market for the same resource pool.

This challenge spreads itself across all disciplines.

\(^2\) To make things easier, I include the ladies in the generic term of “manpower”
4.2 Secondly: the skills mismatch – an education and training issue

To add to this rather discouraging picture is the apparent skills imbalance in several industries that has been the subject of several articles. There is, based on anecdotal evidence and personal observation, an imbalance between the labour force available and the skillsets required by the industry. This obviously is first and foremost identified for the oil and gas sectors, but the same imbalance exists in other essential parts of the economy.

The Construction Sector Council is spending about $100 million annually on training young recruits – training made essential because there are or very few trade schools where secondary school pupils can learn the basics of a trade before graduating.

In Alberta there is an admirable program in place in some schools that enables high school students to start on an apprenticeship program while still at school, earning credits towards their Grade 12 graduation at the same time. If this type of early training program could be expanded to cover the entire country it would go a long way to mitigating the skill shortage.

There appears to be an attitude or policy in Canadian schools (maybe perpetuated by, or instigated by, parents) that everyone needs a university education in order to get a job. Anecdotally, (personal observation) this leads to the situation that some students go to university “to get a degree” without any clear objective of what this degree is supposed to qualify them for. Many university graduates today find themselves in the position that they have a degree in “something” that has no practical application whatsoever in real life – and a student loan that dwarfs their potential income from Starbucks or Tim Horton’s.

So, when the potential retirees step out of the workforce, they will leave behind not only a gap in manpower but in skill.

These factors combine to create the “Perfect Storm” that is threatening the industry in Canada in general, and the energy industry specifically.

5 Proposed Options for Managing the crisis

The short term succession planning – a time horizon of the next 5 years or so – will not be the eye of the storm yet. Certain disciplines will be more stretched than others to find the replacement for baby boomers retiring, but it is the opinion of the author that this will still be manageable. The real crisis, in the opinion of the author, is going to come in the decade to follow. That will be when the current skills shortage and imbalance will start to bite deeply into the Canadian economy and competition for people will be fierce and more so for competent people.

A three-pronged approach is proposed to ameliorate the crisis (the time for solving it is past, I believe):

5.1 Training, training, training:
Secondary schools must encourage students to consider all career options, not only university or college education career paths.
Government policies need to be adapted to encourage all industry branches to create apprenticeship positions – and lots of them. Tax incentives for companies that employ and train apprenticeships should be enhanced, and harmonized across the country. The concept of mandating a minimum ratio of tradespeople vs apprentices may even have to be considered.

Major projects should adopt policies to favour placing contracts with suppliers who have sound and active apprenticeship programs.

Skilled disciplines that are not apprenticeship trades at the moment should be encouraged to employ a mentorship training process. As an example of this one could think of the construction supervisor or construction inspector role so critical to the energy industry expansion projects.

5.2 Effective use of available skilled manpower

Skilled immigrants need to be assimilated into the economy more effectively than had been the case up to now, without a lowering of standards. This may require focused mentorship programs in addition to education upgrades that may be required.

The existing gender imbalance in the trades and professions need to be addressed more effectively. In all the trades and professions, the participation rates of females is nowhere near where it potentially could be and a concerted effort needs to be made to redress this imbalance.

The high unemployment rates among First Nations indicate that there is a resource pool that can and must be tapped. Through effective consultation with First Nations, the currently existing training programs should be expanded and First Nation participation in industrial development encouraged.

5.3 Effective use of temporary foreign workers

This is a temporary relief to the symptoms of the industry’s manpower needs but not a solution to the problem. In a letter to the editor of the Calgary Herald, Tom McCaffery, General Manager of Plains Manufacturing made reference to the fact that skilled temporary foreign workers are essential to keep the Alberta fabricating industry up to speed, as there are not enough skilled, qualified Canadian workers available to fill the required positions.

This is a true statement, but TFW can only and must only be seen as a stop-gap measure – basically buying time until there are adequate numbers of trained Canadians to do the work. And that means that, as the industry relies on TFW to perform the work in hand, training Canadians to take on that role for the work tomorrow must proceed apace.

Federal policy should mandate a specific ratio of skilled TFW vs. Canadian understudies or apprentices must be maintained by employers using skilled TFW.

6 Update June 2015:

This paper would be incomplete (and inaccurate) if not reviewed and annotated in the light of the drop in oil price seen in recent weeks. When the first draft of the paper was written, WTC was
>$100/BBL, and it saw $45/BBL before recovering somewhat. How is this going to influence the Perfect Storm described above?

6.1 The industry has already reacted:
Major lay-offs have occurred, hiring freezes have been implemented, training budgets have been slashed or frozen, capital budgets have been cut. If this sounds familiar, it is because it is: the same happened in the mid-nineties, when oil dropped to below $16/BBL. In a campaign speech in April 2015 the previous premier of Alberta mentioned an accumulated loss of 50,000 jobs in Alberta alone – and in the same month, 20,000 more jobs were lost across the country\(^3\), of which 12,500 were in Alberta. In British Columbia the unemployment rate shot up from 5.8% to 6.3%.

6.2 Short term:
The manpower cuts may not be felt so badly – the capital budget cuts may balance the shortage out in the short term.

6.3 Long Term:
However, when the price of oil recovers, the resulting need for manpower will be as great as or greater than described in this paper. The projects now put on hold will be re-generated but at double the pace. The workers now retrenched will have found other work, and may not be willing to risk another ride on the roller-coaster of jobs in the energy industry.

7 Conclusion:
When all comes together, the Perfect Storm could be of potentially catastrophic proportions.

---

\(^3\) CBC May 8, 2015 – Statistics Canada report