The Perfect Storm, Part II

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Scope of this address

• Follow-up on “The Perfect Storm”, presented at IPEIA in February 2013

• Looking at a wider scope than just the Western Canadian Energy Industry – taking a country-wide view

• Concluding with a proposed three-pronged approach to mitigate the looming crisis

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Agenda

• The Present Resource Situation
• Looking at Two Specific Disciplines
• The Issues facing the Industry
• Proposed Actions to Manage the Crisis
• Update in the Light of Current Economic Conditions
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The Present Resource Situation

• Canada, as a whole, and the Energy Industry in particular, is heading for a crisis in terms of manpower

• This sums up the situation
  – Now for further exploration and discussion
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The Present Resource Situation

• Of Canada’s 18.1 million workers, 3.6 million are in the “retirement age” bracket of 55 to 65
• At the other end, there are 2.8 million potential workers in the 15 to 25 year age bracket
• Do the math

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The Present Resource Situation

<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 25</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 Columbia</td>
<td>3,907,000</td>
<td>2,348,000</td>
<td>463,000</td>
<td>369,000</td>
</tr>
<tr>
<td><strong>Potential Shortfall</strong></td>
<td></td>
<td></td>
<td></td>
<td>~750,000</td>
</tr>
</tbody>
</table>
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Forecast for the Energy Industry

<table>
<thead>
<tr>
<th>Description</th>
<th>The numbers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shortfall between retirees and new entries in job market</td>
<td>215,000</td>
</tr>
<tr>
<td>Add: New positions created due to growth demand</td>
<td>180,000</td>
</tr>
<tr>
<td>Subtotal demand</td>
<td>395,000</td>
</tr>
<tr>
<td>Subtract: Potential new workers</td>
<td>170,000</td>
</tr>
<tr>
<td>Total potential shortfall</td>
<td>225,000</td>
</tr>
</tbody>
</table>

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The Present Resource Situation

• Petroleum Human Resources Council of Canada:
  – To address the growth in the oil sands – 16,000 new workers will be needed in the next decade
  – In the oil sands alone, 30% of the workforce will be due to retire over the next decade – about 6,500 people
  – Total forecast shortfall = 22,500 (about the same as are currently employed in the oil sands sector)
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Competing Demands

• Ontario – refurbishment of nuclear facilities
  – Darlington – 4 units over the decade 2016 to 2025
  – Bruce – 6 units over the decade-and-a-half 2016 to 2031

• Maritime energy industry

• Shipbuilding industry
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Competing Demands

• Darlington – 4 units
  – Each unit will absorb up to 2000 skilled people
  – Each refurbishment will take approximately 3 years

• Bruce – 6 units
  – The refurbishment of these units are of similar magnitude and will overlap with the Darlington units
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Competing Demands

• Maritime energy industry
  – The maintenance of existing facilities in Newfoundland is currently employing some 3000 workers
  – The offshore and onshore expansion will demand more
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Competing Demands

- Shipbuilding industry
  - The DND shipbuilding program should absorb some 2500 skilled workers in BC alone
  - The DND program in the Maritimes will probably require more due to the larger contract
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Competing Demands

- The NGL plants envisioned for BC will require 75,000 skilled workers when in operation.
- A further 60,000 workers will be required during construction.
- These are IN ADDITION to the conventional and heavy oil projects on the books in Alberta and Saskatchewan.
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Specific Discipline Examples

- As examples for review two essential disciplines were selected
- Engineering
- Welding
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Engineering Example

• Undergraduate enrolment has increased by 23% from 2008 to 2012
• The growing trend appears to be stable and continuing
• The participation of female students peaked in 2001 at 21%, then dropped
• In 2012 the female participation rate was just under 20% but shows an increasing trend
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Engineering Example – Total Enrollment

CHART 1.1 – UNDERGRADUATE ENROLMENT
(ACCREDITED PROGRAMS ONLY) (FTE)

- 2008: 57,255
- 2009: 58,872
- 2010: 62,259
- 2011: 66,316
- 2012: 70,201

+2.3%  +2.8%  +5.8%  +6.5%  +5.9%

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Engineering Example – Enrollment Figures

CHART 1.7 – UNDERGRADUATE ENROLMENT BY GENDER (FTE)*

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

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Engineering Example

• Foreign undergraduate students (student visa) make up 13% of the total
  – It is unknown how many of these remain in Canada

• Immigrant engineers peaked in 2001 at 16,000 per annum

• Currently immigrant engineers number under 6,000 annually, and last available statistics show a downward trend
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Engineering Example – “Immigrant Engineers”

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Engineering Example – Mid- to Senior Engineers

• Undergraduate enrolment in the mid-1990’s was around 60% of the current levels
  – This coincided with the oil price being under $16/BBL
  – New grads had a hard time finding work, and moved on to other fields
  – This is where, in the short term, the replacement of retirees would be sourced from
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Engineering Example – To Sum Up

• There are well-experienced senior engineers, moving into the retirement age bracket

• There are good prospects for adequate numbers of young engineers coming into the industry

• There is a gap in the middle – in a decade or so the senior engineering bracket will be sparsely populated!
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Welding Example – British Columbia

• As example of the critical trades affecting the energy industry, welding was selected
• Currently there are 10,300 welders in all industries in British Columbia
• If only half of the LNG projects come to fruition, some 39,000 workers will be required
  – Estimate 25% of those to be in the welding and related trades
From 2009 to 2014, 4048 persons obtained pressure welder certification in Alberta ("B" or "C" tickets)

1171 of those were from elsewhere in Canada

- This resource is likely to dry up as momentum picks up in other parts of the country
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Welding Example - Apprentices

• There were, on average 17,000 welding apprentices across the country for each of the last five years
• In 2012 this stepped up to 19,000
• This is encouraging, but nowhere near enough to meet the requirements of a recovered/stimulated Canadian economy
• Other trades face a similar shortfall
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Welding Example – To Sum Up

• The skilled trades face a growing shortfall of people

• There are not enough apprentices to meet the current demand and this is going to get worse in 5 to 10 years
  – Not enough skilled new workers
  – Older personnel retiring
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The Issues facing the Industry

• The looming crisis is two-fold:
• The first part is simple arithmetic indicating a shortfall in available human resources
• The second part is an imbalance in retiring skills sets and replacement skill sets
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The Issues facing the Industry

• The shortage of resources have been discussed
• The mismatch in skills sets:
• The energy industry – often quoted as the economic driver of the Canadian economy – employs less than 2% of the Canadian workforce
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The Issues facing the Industry

• Other economic drovers are construction (~6.5%) and manufacturing (~9%)
• The main economic drivers thus employ ~17% of the total workforce
• This where the higher skills sets are required
• Retail is the largest employer, mostly part-time, with the lowest entry barriers in terms of skillset requirements
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The Issues facing the Industry

Figure 2 Proportion of the employed population aged 15 years and over, by industrial sector, May 2011

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The Issues facing the Industry

• The looming crisis is two-fold:
• The first part is simple arithmetic indicating a shortfall in available human resources
• The second part is an imbalance in retiring skills sets and replacement skill sets
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The Issues facing the Industry - Mismatch

• Employers in the “economic drivers” require and expect trained employees in whatever skill category is in demand

• Potential employees (high school graduates appear to either aim high (university education) or low (jobbing, temporary, part-time)

• Not enough students are choosing to go into the skilled trades
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Proposed Options to Manage the Crisis

• Training, training, training
• Effective use of available manpower
• Effective use of temporary foreign workers

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Proposed Options - Training

• Secondary education must encourage students to consider all career paths, not primarily college or university
• Government policies at all levels need to be focused on encouraging/creating apprenticeship positions
• Non-apprenticeship skills need to formulate mentoring programs

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Proposed Options - Training

• Governments at all levels may have to consider stipulating a mandatory tradesperson to apprentice ratio

• Major projects should consider preferential treatment of suppliers with proven and effective apprenticeship programs

• The current Federal Apprenticeship Incentive Grant program is a welcome step – hopefully it will continue
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Proposed Options – Effective Use of Available Resources

• Improving the participation ratio of the female gender in all skilled disciplines
• Improved assimilation of immigrant skills into the workforce, without lowering standards
  – Tailored mentoring programs
  – Phased recognition of certifications
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Proposed Options – Effective Use of Available Resources

• Temporary Foreign Workers do not constitute a cure for Canada’s skills shortage – it is merely treating the symptoms
• Temporary Foreign Workers are necessary to keep the frenetic pace of development going
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Proposed Options – Effective Use of Available Resources

• BUT the skills represented by Temporary Foreign Workers must be effectively transferred to Canadians
  – Mandatory “understudy” - apprentices
  – Mandatory time limit on the use of Temporary Foreign Workers
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Conclusion

• The Canadian industry as a whole is heading for a serious manpower crisis

• This crisis cannot be averted anymore – we can only work to minimize the effect of the crisis

• A three-pronged approach is proposed
  – Training
  – Effective use of available resources
  – Effective use of temporary foreign workers
How is the Current Low Oil Price going to affect this?

• Already the drop of around 50% in oil price has resulted in lay-offs and hiring freezes

• External training budgets were next in the firing line – conference attendance allowance were slashed, for example

• Next came internal training budgets – established training programs have been cut back or suspended
How is the Current Low Oil Price going to affect this?

• Somehow, this is familiar – the industry is simply repeating the mistakes of the mid-nineties

• In addition to the reduction in manpower resources already described, the current energy climate is going to mean more people will look for jobs elsewhere
How is the Current Low Oil Price going to affect this?

• Long-term training and education will be the next casualty – i.e. apprenticeships, tertiary education support, research

• In the (very) short term, the lay-offs and hiring freezes may not be felt so much, as capital budgets are also being slashed

• Medium to long term, the cut-backs today will exacerbate the Perfect Storm to come!
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QUESTIONS?