

Alberta Pressure Vessel Manufacturing Sector Benchmarking Report 2008

Provincial Trends: Global Currents



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The information contained in this Analysis is based on unaudited statistical and other information obtained through public sources, PricewaterhouseCoopers' proprietary information sources, the Government of Alberta, and interviews and surveys of with individual representatives of the Pressure Vessel Manufacturing Industry. As such, data accuracy and validity is subject to the limitations imposed by the accuracy of the data sources.

PricewaterhouseCoopers wishes to thank all of the organizations that provided information throughout the course of this project.

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1 Executive Summary

Alberta produced an estimated average of 1.25 million barrels per day of crude bitumen in 2006 with a 300% increase in production anticipated by 2020¹, thus creating a need for further bitumen upgrading and refining within Alberta to maximize the value of the resource. At present, projects related to this expansion are valued in excess of \$150 billion. Based on this demand, Alberta is quickly becoming one of Canada's major manufacturing centres behind only Ontario and Quebec.

The pressure vessel manufacturing industry plays a critical role in the development of oil sands and its resultant downstream processing, and is therefore poised to capture substantial growth opportunity. Realization of this growth is not without issues or challenges that must be overcome to maintain competitive advantage.

Benchmarking is a powerful tool that allows both participating companies and the Alberta Government to better allocate their resources and serve as a driver for change. To this end, Alberta Finance and Enterprise and the Alberta Pressure Vessel Manufacturers' Association engaged PricewaterhouseCoopers LLP to conduct a benchmarking study to provide Alberta pressure vessel manufacturing companies with insight on their relative competitive positioning within a global context.

Working with representatives of the Alberta pressure vessel industry:

- benchmark statistics were selected that were available through provincial, national and international sources. International sources included: France, Germany, Italy, South Korea, Spain, the UK and the US.
- a benchmarking questionnaire was developed to gather financial and operational performance information from participating companies. To ensure comparability between organizations of different sizes, financial statements were constructed in a "common size" format (i.e. as percentages of the total revenue).

The North American Industry Classification System (NAICS) 2007² was used as a common basis for defining Alberta's pressure vessel sector and selecting comparable national and international data.

The reporting period for the data provided was the fiscal year ending December 31, 2006. Participating companies were directed to exclude field costs from the performance information they provided.

Key Findings

Alberta's companies' performance was measured against national and international data collected and the following key points emerged from the data:

- In terms of average revenue generated by employees, Alberta companies generate one of the highest revenue per employee (\$251,245), second only to Italy (\$253,616). At the lower end of the scale are Spain (\$141,764) and South Korea (\$170,731), while the remaining countries are similar in terms of this performance measure. Alberta companies participating

¹ <http://www.alberta-canada.com/energyTechnologyServices/industryIntelligence.cfm>

² North American Industry Classification System (NAICS) 2007, <http://stds.statcan.ca>

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in this study generate significantly higher revenue per employee when compared to the Canadian industry as a whole.

- With all cost categories considered the average net income before tax of participating Alberta companies in 2006 was 9.41% of total revenue.
- South Korea (38.6%), and the US (29.7%), are garnering the highest net incomes before tax as a percentage of total revenues. The Canadian industry as a whole generates the lowest proportional net income before tax (3.0%), with Alberta participants positioned in the middle (9.41%).
- Alberta industry participants confirmed that two main cost drivers impact industry performance - Material & Supplies (44%) and Labour (33%) – adding up to an average of 77% of the total revenues. Within the Labour costs, Production Wages totalled 23% of revenues.
- Alberta companies participating in this Study have the highest proportion of total wage and salary costs (33%) compared to the Canadian industry as a whole and all other countries.
- South Korea posted the lowest proportional cost (61.4%) in the grouping, followed closely by the US (70.3%). Canadian companies (including Alberta participants in this Study) reported the highest proportion of total costs (97%) as a percentage of total revenue.
- Comparing participating companies in Alberta to the rest of Canada (1.7%), Alberta companies have lower energy cost proportions (1.2%) as a percentage of total revenue.

Issues and opportunities

Alberta's metal products fabrication sector is forecast to generate approximately \$48 billion in revenues from 2005 to 2010. Contributing approximately 25% of the metal fabrication industry's overall shipments³, the tank, pressure vessel and heat exchanger manufacturing sector is poised to capture substantial growth opportunity, in part due to key strategic advantages that Alberta manufacturers have over their competitors:

- Proximity to end customers translates into three benefits:
 - Being close to the market they serve allows Alberta companies to develop stronger relationships with their customers leading to a better understanding of local market conditions and opportunities
 - The local industry is well positioned to provide timely and ongoing service and after market support to these customers
 - The sheer size of some of the required vessels combined with transportation considerations makes Alberta producers the logical choice for larger scale projects.
- Representing an industry with deep roots in Alberta's oil and gas industry, these companies have deep knowledge and expertise in manufacturing pressure vessels for local customers to meet Alberta's demanding conditions in terms of weather and safety, all resulting in products unmatched in quality and reliability by current competitors.
- In response to the cost pressures growing in the market for much of the last decade, many companies are already engaged in significant productivity improvement programs. Such efforts include the adoption of Lean manufacturing practices, expanded use of production

³ Government of Alberta, <http://www.alberta-canada.com/metalFabrication/expertise.cfm>

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and design software, labour development, building efficiency practices, etc. By taking on these practices promptly, many of Alberta's pressure vessel producers have protected and expanded their competitive strengths in both their domestic and export markets.

Many of the challenges currently affecting the pressure vessel industry apply to the entire Alberta economy and derive from present economic conditions. Among these, the most important, as viewed by the study participants, were:

- Overall increase in labour costs and shortage of qualified workers - especially B-pressure welders.
- Technical personnel are targeted by energy resource company recruiters – pressure vessel manufacturers find it difficult to compete with larger companies offering higher salaries and more comprehensive benefits.
- Access to certain raw material is costly due to the distance and related freight charges.
- Energy costs are higher in Alberta than other global jurisdictions.
- Costs associated with adhering to Alberta's strong health and safety standards layer additional costs on Alberta products making it difficult often to compete in the international marketplace.
- Foreign exchange rates and the appreciating Canadian dollar significantly impact the bottom line of those manufacturers exporting products to the US and elsewhere. A strong Canadian dollar makes it difficult to remain competitive in international markets.
- Weaker foreign currencies compared to the Canadian dollar highlights the Canadian market as an attractive option for countries exporting to Canada.

Other challenges, specifically impacting the pressure vessel industry, were identified by Study participants as follows:

- B-pressure welding ticket requirements and overall labour costs are higher than other jurisdictions.
- Adding to the labour costs, Alberta develops welders through an apprenticeship program where other jurisdictions do not and can train individuals "in-house" in accordance with the American Society of Mechanical Engineers (ASME) code.
- Participants believe that manufacturing standards and codes--e.g. ASME and Alberta Boilers Safety Association (ABSA)--for pressure vessels manufactured in Alberta are very stringent in comparison to manufacturing standards applied in competing countries. Higher manufacturing standards increases the cost to produce a pressure vessel in Alberta making it difficult to compete in the international market. In addition, pressure vessels manufactured in other countries may not meet Alberta quality standards and Alberta pressure vessel manufacturers are often hired to "re-work" products to meet Alberta standards. Alberta manufacturers would like to make their products more cost-competitive to compete on the international market thereby manufacturing the pressure vessel in its entirety, rather than simply doing the "re-work".
- Industry sees the regulatory environment (e.g. labour laws, health and safety regulations, and ASME and ABSA codes) as complex and costly.
- Pressure vessel manufacturers are also of the belief that many Albertan buyers do not tender jobs to local companies as a result of the assumptions that local companies:
 - Do not have enough expertise to meet client specifications/requests.
 - Do not have sufficient capacity to take on Alberta projects.
 - Are too costly and consequently do not tender jobs to local companies.

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Most of the study participants see companies, government and the industry association working collaboratively to address the issues identified by:

- Developing productivity and innovation services/support for the industry. Alberta companies are looking at new processes, products and technologies to compete globally, and support that they can draw from service providers to increase speed and confidence as they penetrate the market.
- Increasing access to foreign labour by reducing or eliminating onerous immigration requirements and bureaucracy.
- Considering incentives/ tax credits where possible. Companies indicate the expanded Scientific Research & Experimental Development and Accelerated Capital Cost Allowance programs as examples of programs that could be used in developing a tax incentive to support industry interests in training skilled workers.
- Reducing the regulatory burden imposed through quality control standards. Exceeding ASME standards is seen to add costs for Alberta's industry players that other constituencies can avoid.
- Reviewing/modifying the apprenticeship program to better suit industry's needs. As the demands for more workers and higher skills increases, more expectations are placed on Alberta's post-secondary schools to tailor their programs to industry needs.
- Using the opportunity to work closer with the client industry (oil and gas) to plan for and meet their anticipated needs (e.g. new development, latest technologies, environmental considerations, etc). Such supply chain planning would benefit all parties by reducing costs, increasing project speed and allowing for new efficiencies to emerge.
- Industry working cohesively in order to develop a strong provincial, national and global presence.

2 Project Context

Alberta is currently producing over 1 million barrels per day of bitumen from the oil sands and has the potential to reach over 3 million barrels per day by 2020, creating a need for further bitumen upgrading within Alberta to maximize the value of the resource. This production plan will require more than \$150 billion of new oil sands construction spending in the next 15-20 years, much of it for fabricated metal products.

Based on that demand, Alberta is quickly becoming one of Canada's major manufacturing centres behind only Ontario and Quebec. The pressure vessel manufacturing industry plays a critical role in the development of oil sands and downstream processing. Opportunity will remain strong, based on continuing domestic and U.S. demand. Simply put, as long as the world price of oil remains moderately high, manufacturing in Alberta is likely to grow.

Market opportunity of this magnitude has attracted the attention of the world and global supply chains emerging from Alberta have been expanding and forming as new oil sands construction cycles begin. This presents a remarkable opportunity for Alberta's metal fabrication companies to grow. It also sets the stage for new competition to arrive from points across the country, continent and world.

Benchmarking is a powerful tool that allows both participating companies and the Alberta government to better allocate their resources and serve as a driver for change. Industry participants can identify those areas where they may be able to work smarter, achieve and maintain competitive advantages, identify gaps and opportunities for enhancement and integrate them into their strategic planning activities. Benchmarking also provides valuable information to assist the Alberta government in promoting the development of manufacturing sub-sectors, as well as identification and planning for infrastructure supports.

To this end, Alberta Finance and Enterprise ("AFE") and the Alberta Pressure Vessel Manufacturers' Association ("APVMA") engaged PricewaterhouseCoopers LLP ("PwC") to conduct a Benchmarking Study ("Study") to provide Alberta pressure vessel manufacturing companies with insight on their relative competitive positioning within a global context.

The APVMA, representing approximately 70 percent of the provincial pressure vessel manufacturing capacity, was instrumental in providing valuable input and guidance in this study and championing industry participation in the Study.

3 Scope of the Study

In establishing the scope of this Study, a number of factors impacted both the companies participating in the study as well as the availability of comparable provincial, national and international benchmark statistics. While national and international data sources exist around the world, it was particularly important to ensure benchmarking information that was gathered from specific Alberta companies was comparable to other data sets. Working collaboratively with industry representatives from the APVMA and members of the project steering committee from AFE, benchmark statistics were selected that were reported on within provincial, national and international sources.

3.1 Alberta Industry

The APVMA membership is comprised of Alberta's pressure vessel and heat exchanger manufacturing companies. Within the industry there is significant diversity based on several

factors including size, market orientation, specialization, etc. Companies in the sector typically produce either large vessels and exchangers or they offer the market “packages” consisting of smaller diameter vessels connected to other equipment.

A significant amount of discussion took place as to what constitutes a pressure vessel (e.g. inclusion of internal and/or external components, differentiation based on materials used in construction, storage versus production, etc.) within the context of this study. From those discussions, a small industry working group was able to reach consensus on common features of the pressure vessel industry to clarify the scope of this Study. The definitional scope arrived at by the participants included the following:

Minimum requirements:

- Complies with ASME code
- Pressure of 15 psi or greater
- Vessel size is 25 inches or greater
- Constructed at a manufacturing facility; not “in the field”.

Distinguishing features:

- Internals or “empty” vessel
- Materials – carbon steel or alloy
- Storage or production vessel.

Industry participants suggested a broad segmentation of the industry along key operational features: stand alone vessel production versus packaged applications construction (of which pressure vessels are a constituent).

A limited number of companies producing packaged applications were able to participate in the study. In order to maintain overall Study confidentiality and ensure individual company performance information could not be attributed back to individual participants, this benchmarking study focuses solely on stand alone pressure vessels. Therefore, when participating companies were compiling their performance information in response to the survey, only costs related directly to the development and manufacturing of pressure vessels were considered. Companies that manufactured modular units were required to segregate and report only those costs that are directly attributable to manufacturing of pressure vessels. The reporting period for the data provided was the fiscal year ending December 31, 2006. Participating companies were also directed to exclude field costs from the performance information they provided.

3.2 Statistical Data Sets

The North American Industry Classification System (NAICS) 2007⁴ was utilized as a common basis for defining Alberta’s pressure vessel sector and selecting comparable national and international data.

Canadian and United States (US) data included two NAICS codes:

- **Power Boiler and Heat Exchanger Manufacturing (332410)** - This industry code comprises establishments primarily engaged in manufacturing power boilers and parts

⁴ North American Industry Classification System (NAICS) 2007, <http://stds.statcan.ca>

and industrial heat exchangers, by the process of cutting, forming and joining metal plates, bars, sheets, pipe mill products and tubing, to custom or standard design, for factory or field assembly. These establishments may engage in both fabrication and installation.

- **Metal Tank (Heavy Gauge) Manufacturing (332420)** - This industry code comprises establishments primarily engaged in cutting, forming and joining heavy gauge steel to manufacture tanks. Establishments primarily engaged in fabricating and erecting large storage tanks, which must be assembled at the site, are included.

International coordination focused on normalizing industry classification systems made it easier to identify comparable statistical data for Germany, France, Italy, Spain, United Kingdom (UK) and South Korea. Nonetheless, each data set (EuroStat for the EU countries and SourceOECD for South Korea) used slightly different definitions to describe its industry sectors. Accordingly, a combination of the guidance documentation accompanying the data and professional judgement was used to select the most appropriate definitions and corresponding data sets used for comparisons within this Study.

To select parallel data sets for the economic activities in the European Union, Canada Statistics' Concordance Table⁵ was used. The most comparable data sets were selected corresponding to NACE's code **DJ.28.21 – Manufacture of tanks, reservoirs and containers of metal** (i.e. Heavy-gauge metal tanks – including pressure vessels – manufacturing).

Similarly, the Concordance Table for ISIC⁶ codes was used to select comparable data for South Korea. The most appropriate code was considered to be **D2812 – Manufacture of tanks, reservoirs and containers of metal** (i.e. heavy-gauge metal tanks – including pressure vessels – manufacturing).

Alberta survey participants provided performance information related to the 2006 fiscal year. One of the participating companies was acquired during 2006 and consequently only 2007 data was submitted. This company's 2007 data did not materially impact the average performance results presented in this Study.

National and international statistics were available for each year between 2003 and 2005. As a result, trend information pertaining to specific benchmarks (2003 – 2005) rather than point data was analyzed to ensure that no conclusions were based on measures that were drastically trending up or down. In turn this provided the rationale for comparing 2006 data for Alberta companies against 2005 data available in other jurisdictions.

For comparability purposes, all data sets were converted to Canadian dollars, based on the Bank of Canada's published annual average exchange rates as at December 31 for each year⁷.

⁵ Statistics Canada, <http://www.statcan.ca/english/Subjects/Standard/concordances/naics2002-to-nacerev1-1.htm>

⁶ Statistics Canada, <http://www.statcan.ca/english/Subjects/Standard/concordances/naics97-to-isisrev3.htm>

⁷ Bank of Canada, http://www.bank-banque-canada.ca/en/rates/exchange_avg_pdf.html

4 Collection of Data

4.1 Alberta Industry Data

Eight Alberta pressure vessel manufacturers participated in the benchmarking survey (see Appendix I – Alberta Benchmarking Participants). Working with representatives of the Alberta pressure vessel industry, a benchmarking questionnaire was developed to gather financial and operational performance information from participating companies (See Appendix II – Alberta Pressure Vessel Benchmarking Questionnaire). Definitions for each category of financial and operational information requested were also developed to guide participants in submitting performance information to ensure consistency with other participants.

Using PwC's secure web-enabled benchmarking survey tool, participants submitted their company data. Company data was then reviewed to confirm that the data submissions were complete. Once the data was reviewed, participating companies were provided with individual company reports that ranked their operating performance against the consolidated results for all Alberta participants. The statistical distribution of each metric was also provided, including weighted average, median, as well as top and bottom quartiles.

Confidentiality of company specific data is a primary concern, therefore only the consolidated data (grouping average) is used throughout this Study for comparison with other jurisdictions. The following table outlines the minimum disclosure sample size requirements used for each data point collected.

Type of Disclosure	Minimum Product / Region Disclosure Sample Size
A. Mean weighted average will be disclosed if these criteria are met.	(a) There are at least 5 providers reporting data on which each disseminated statistic is based. (b) No individual provider's data represents more than 25% on a weighted basis of that statistic. (c) Any information disseminated is aggregated such that it would not allow participants to identify any provider of the data.
B. Median and range data	(a) 8 or more operations (b) No individual provider's data represents more than 25% on a weighted basis of that statistic. (c) Any information disseminated is aggregated such that it would not allow participants to identify any provider of the data.
C. In no instance will a sub-group be disclosed where it would result in disclosure (by definition) of the operations excluded from the sub-group.	
D. In the case where the minimum data requirements for disclosure of mean weighted average, median and range are not met, then the report will be limited to average unit cost where possible.	

4.2 Canadian National Data

Data representing Canadian pressure vessel manufacturing for 2003 – 2005 was sourced from Statistics Canada CANSIM table 301-0006 – Principle Statistics for Manufacturing Industries. The trend lines between 2003 and 2005 were considered in the comparative analysis (Section 7.0) of this study.

4.3 International Data

4.3.1 United States

US data was drawn from the US Census Bureau and the Annual Survey of Manufacturers for the study period (2003 – 2005). (See Appendix III for data summary).

4.3.2 South Korea

Data for the South Korean pressure vessel industry was available from the SourceOECD on-line database covering 2003 to 2004. (See Appendix III for data summary).

4.3.3 European Statistics (UK, Italy, Spain, Germany and France)

European pressure vessel manufacturing data was taken from Euro Stat's Annual Enterprise Statistics on Industry and Construction database, 2003 – 2005. (See Appendix III for data summary).

5 Alberta Industry Benchmark – 2006 Fiscal Year

The following industry data is based on information submitted by study participants. Due to confidentiality requirements, no ranking or quartile data, but only (weighted) average values for the grouping are presented in this report. To ensure comparability between organizations of different sizes, financial statements were constructed in a “common size” format (i.e. all lines were presented as percentages of the total revenue).

Participating companies’ revenues add up to about 11% of the Canadian industry. Total number of staff employed by the participating companies represented approximately 8% of the total number employed by the Canadian industry.

ALBERTA DATA OVERVIEW

	Grouping Average (% of Total Revenue)
Gross Revenue	100%
Cost of Sales	
Wages - Production	20.53%
Materials and Supplies	43.61%
Engineering	1.90%
Subcontractors	6.44%
Repairs and Maintenance	1.65%
Cost to Own or Rent/ Lease Equipment	0.98%
Other	3.02%
Total Cost of Sales	78.12%
Gross Margin	21.88%
General & Administrative Expenses	
Wages - General and Administrative	6.08%
Utilities - Gas	0.64%
Utilities - Electricity	0.56%
Travel and Lodging	0.26%
Advertising and Promotion	0.47%
Insurance	0.20%
Training	0.31%
Health and Safety	0.20%
Cost to Own or Rent/ Lease Property and Production Facilities.	1.17%
PropertyTax	0.25%
Finance	0.91%
Legal and Professional Fees	0.22%
Other	1.17%
Total G&A Expenses	12.46%
Net Income (Loss) Before Tax	9.41%

- Alberta industry participants confirmed that two main cost drivers impact industry performance - Material & Supplies and Labour.
- At an average of 44% of total revenue (48% of total costs), Materials and Supplies represent the largest expenditure for pressure vessels manufacturers.
- Production Wages averaged 21% of total revenues (23% of total costs). When General & Administrative Wages and Subcontractors costs are included, labour costs increased to 33% of total revenue (36% of total costs).

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- With all cost categories considered the average Net Income Before Tax of participating companies in 2006 was 9.41% of total revenue.

In addition to the financial information presented above, operational statistics were collected/ derived to assist participating companies with identification of performance gaps, opportunities for improvement and allocation of resources. These operating statistics are provided in this report for information only.

	Grouping Average
Other operational information	
Total Manufacturing Labour Hours (hours)	171,249.25
Number of Hourly Employees (persons)	87.88
Hourly employees - total hours worked (hours)	175,184.50
Number of Salaried Employees (persons)	28.13
Salaried Employees - Total Hours Worked (hours)	52,255.00
Total Number of Employees (persons)	116.00
Total Number of Hours Worked (hours)	227,439.50
Manufacturing Area (sq.ft.)	54,222.13
Employee Turnover - Hourly Voluntary (persons)	29.86
Employee Turnover - Hourly Involuntary (persons)	7.57
Employee Turnover - Salaried Voluntary (persons)	Not released*
Employee Turnover - Salaried Involuntary (persons)	2.75
Apprentices (persons)	19.13
Journeymen (persons)	32.13
B-Pressure Welders (persons)	18.63
Production Backlog (\$)	30,393,784.75
Scientific Research and Experimental Development (\$)	Not released*
Trade Accounts Receivable (As at December 31, 2006) (\$)	5,902,729.75
Trade Accounts Payable (As at December 31, 2006) (\$)	2,088,850.38
Operating Statistics	
Cost of Gas/ Square Foot (\$/sq.ft.)	3.17
Cost of Electricity/ Square Foot (\$/sq.ft.)	3.12
Hourly Labour Rate (\$)	32.53
Revenue per Employee (\$/person)	241,253.97
Net Income (Loss) per Employee Before Tax (\$/person)	21,286.05
Training Costs per Employee (\$/person)	672.19
Total Payroll Costs as % of Revenue	27.24
Health and Safety Costs as % of Revenue	0.20
Gross Margin (%)	21.88
Creditor Days (days)	70.35
Debtor Days (days)	47.84
Ratio of Apprentices to Journeymen	1.29
Value of Purchase Orders/ Contracts Not Produced as % of Total Revenue	0.84
Labour Hours per Square Foot (hours/sq.ft)	4.79
Revenue per Square Foot (\$/sq.ft.)	601.48
Revenue per Labour Hour (\$/hour)	123.80

* Confidentiality requirements not met.

6 Comparison of Alberta to Other Jurisdictions

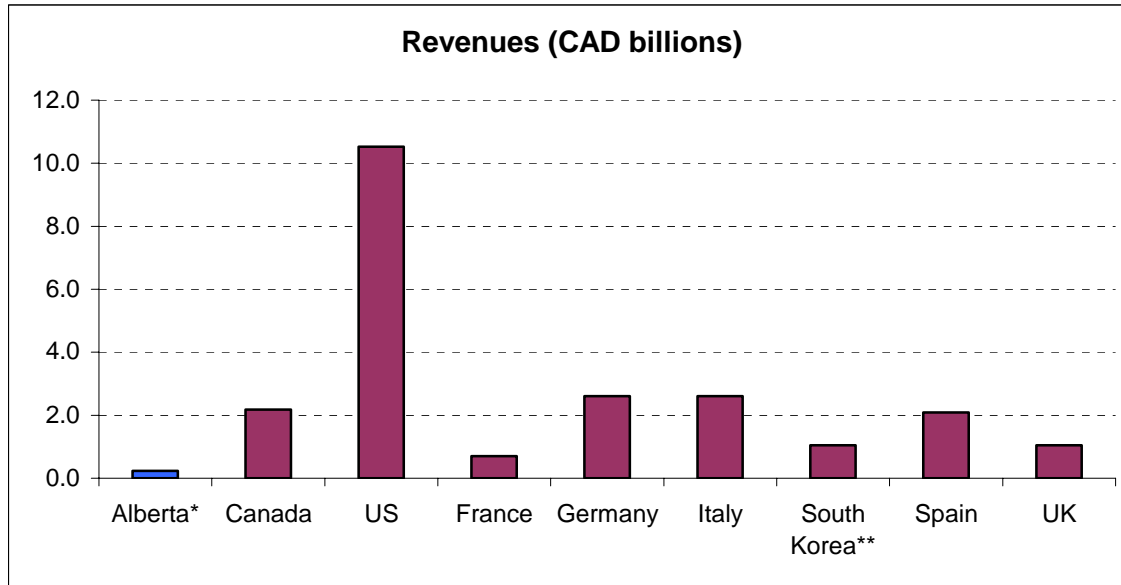
In order to assess Alberta's companies performance globally, national data for the pressure vessel industry was obtained from Canada, US, France, Germany, Italy, South Korea, Spain and the United Kingdom.

Using definitions associated with the data collected and professional judgement, a set of seven common financial indicators and performance measures were identified for the purposes of this comparison. As mentioned before, international data availability was limited to 2005 and prior years, while Alberta data referred to 2006, therefore data trends were considered when performing our comparisons.

Alberta data is based on the information provided by the eight companies participating in the Study. The data provides a representation of the pressure vessel industry structure. However, the data does not represent the total size of the industry since not all companies participated in the study and Statistics Canada data for the Alberta industry was not disclosed due to confidentiality constraints.

6.1 Revenues

The graph below was developed to provide an indication of the size of the top global competing industries:

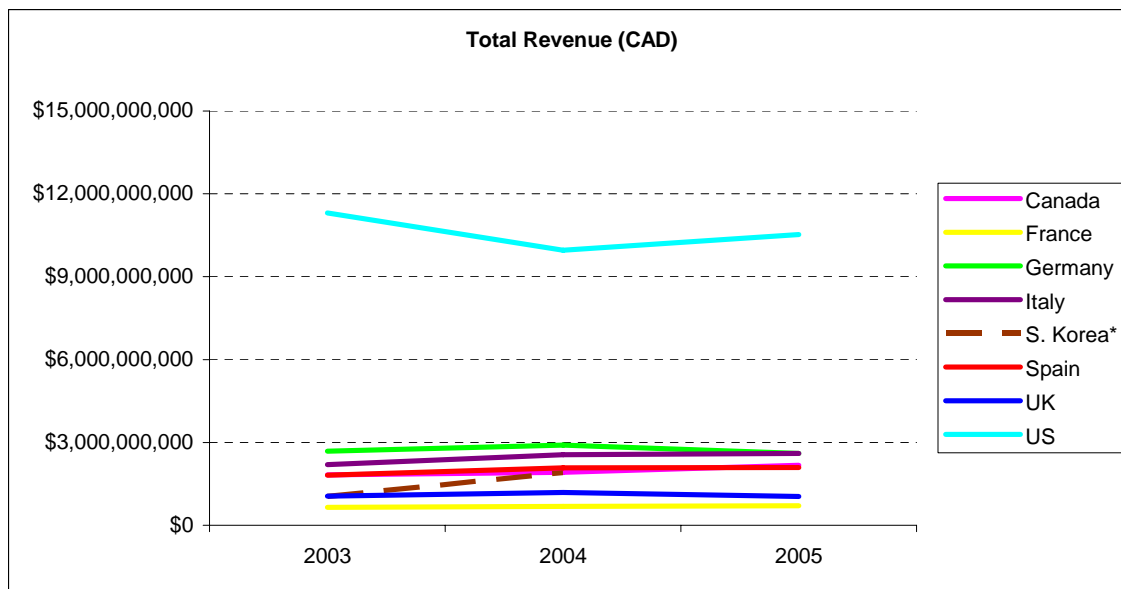


* Alberta data is for the 8 companies participating in this report and represents the year 2006. The Canada data includes the Alberta data.

** South Korea data refers to 2003 revenues.

All other country data represents 2005 revenues.

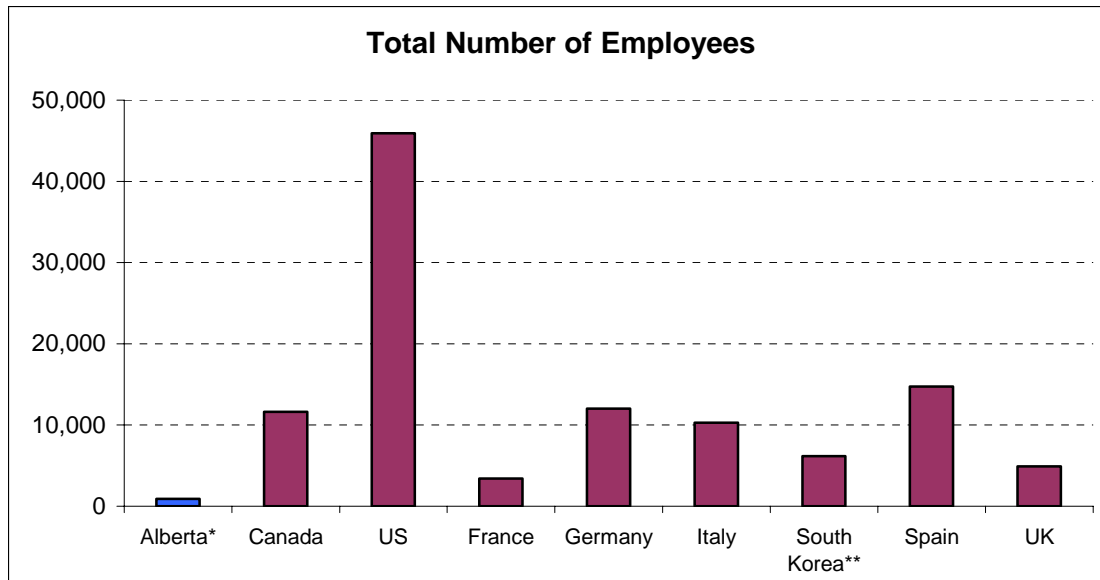
With the exception of the US, all of the remaining countries producing pressure vessels and heat exchangers are of comparable size in terms of revenues generated. Trend analysis shows declining industry revenues in the US with all other countries reporting stable revenues. South Korean trend is based on extrapolated data as Korean industry data was not available.



* Trend is based on an extrapolation of available 2004 data. No data exists for 2005.

6.2 Number of Employees

The number of personnel employed by the industry in each country corresponds to the total value of revenues generated:



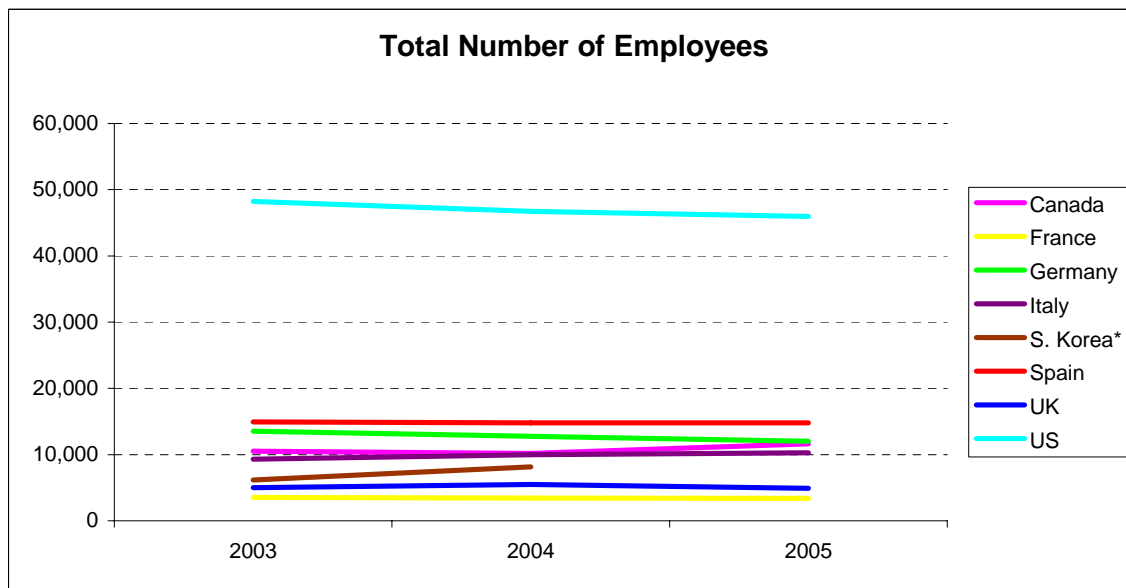
* Alberta data is for the 8 companies participating in this report and represents the year 2006. The Canada data includes the Alberta data.

** South Korea data refers to year 2003

All other country data represents the number of employees in 2005

Trend analysis shows a relatively stable number of employees with two exceptions:

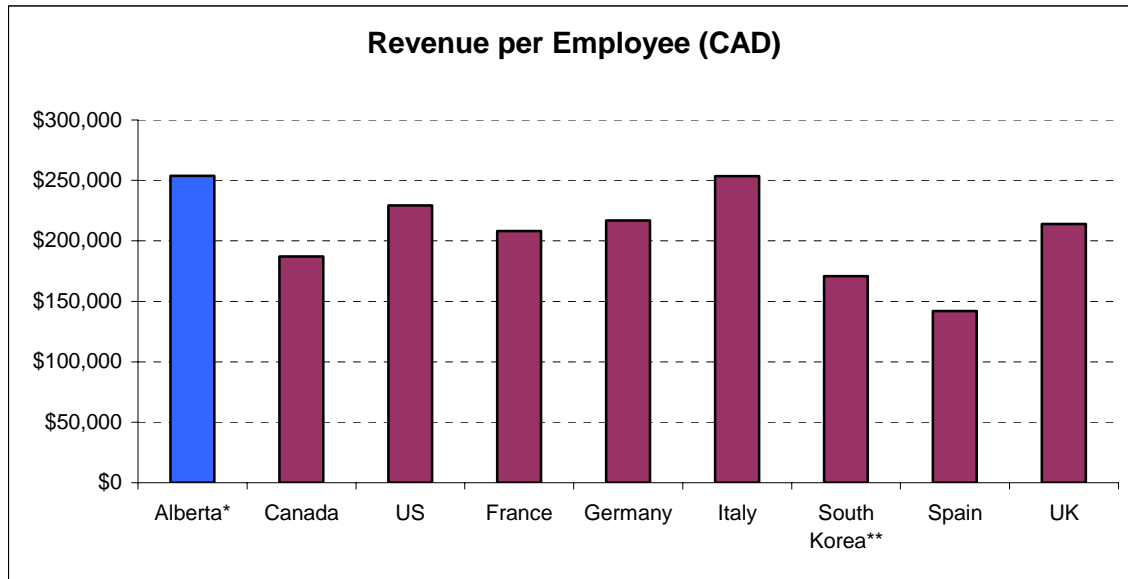
- US, where the number of employees declined slightly in tandem with the revenues, and
- South Korea where a 33% increase in number of employees was observed in 2004 over 2003.



* No data exists for 2005.

6.3 Revenue per Employee

In terms of average revenue generated by employees, Alberta companies generate one of the highest revenue per employee, second only to Italy. At the lower end of the scale are Spain and South Korea, while the remaining countries are similar in terms of this performance measure. Alberta companies participating in this Study generate significantly higher revenue per employee when compared to the Canadian industry as a whole.

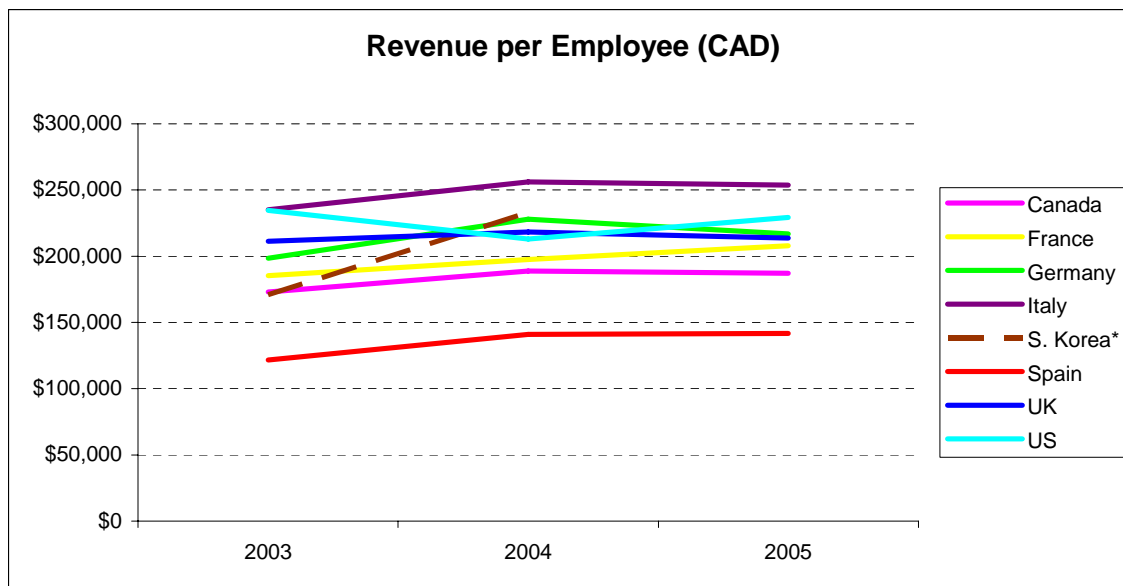


* Alberta data is for the 8 companies participating in this report and represents the year 2006. The Canada data includes the Alberta data.

** South Korea data refers to year 2003.

All other country data represents revenue per employee in 2005.

Trend analysis shows slight increases in revenues per employee for most countries included in the Study with the US trend picking up again in 2005 after the decline between 2003 and 2004. South Korean trend is based on extrapolated data as Korean industry data was not available.



* Trend is based on an extrapolation of available 2004 data. No data exists for 2005.

6.4 Wages and salaries

Wages and salaries represent total payroll costs and are presented as percent of total revenues:

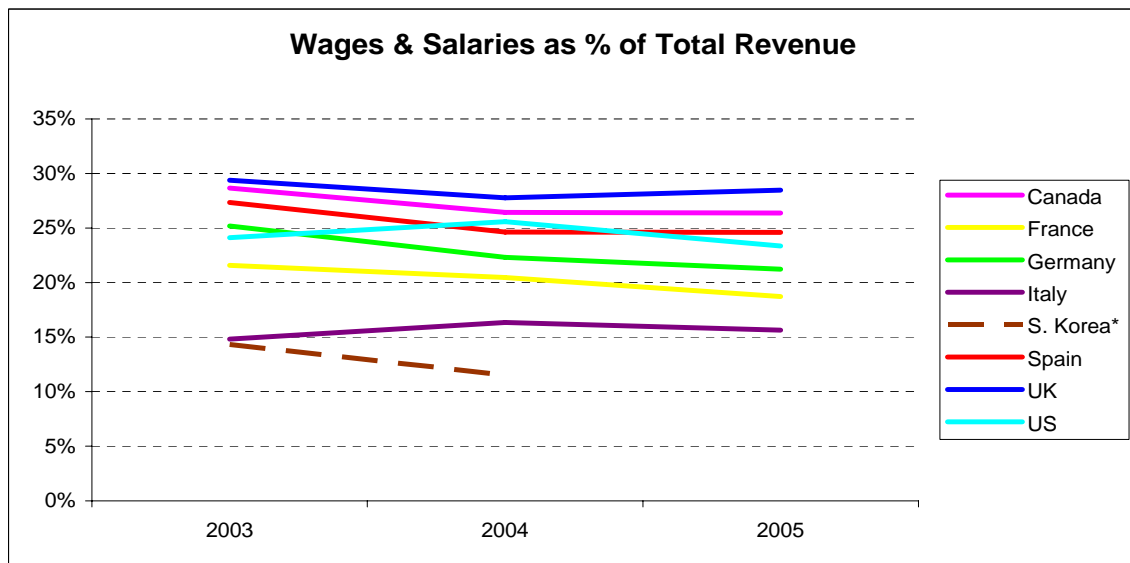


* Alberta data is for the 8 companies participating in this report and represents the year 2006. The Canada data includes the Alberta data.

** South Korea data refers to year 2003.

All other country data represents wages and salaries in 2005.

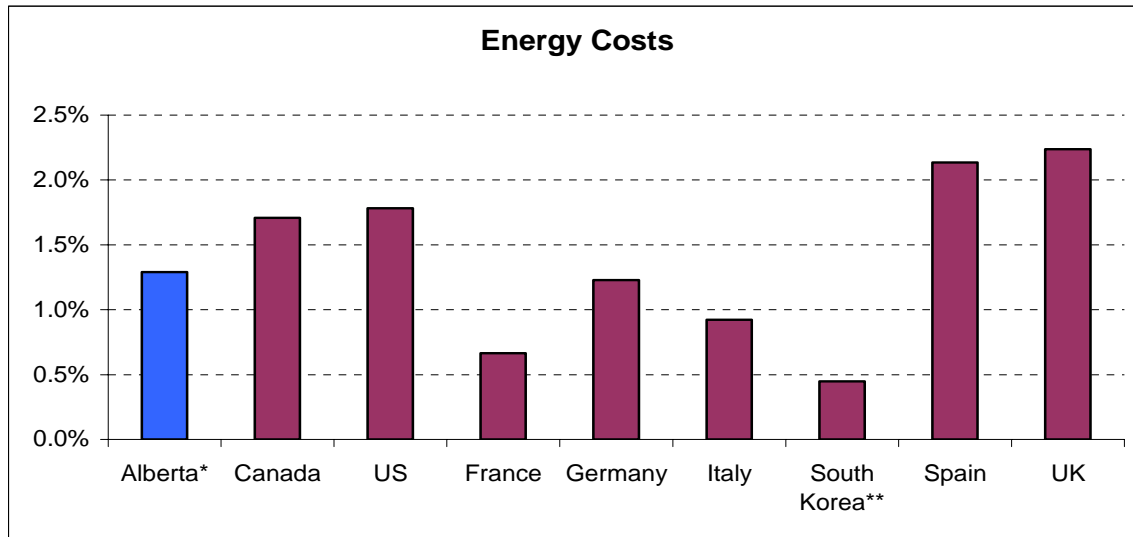
Alberta companies participating in this Study have the highest proportion of total wage and salary costs compared to the Canadian industry as a whole and all other countries. Wage and salary trend analysis suggests that no material differences are anticipated between 2005 and 2006. South Korean trend is based on extrapolated data as Korean industry data was not available.



* Trend is based on an extrapolation of available 2004 data. No data exists for 2005.

6.5 Energy costs

Energy costs include electricity and natural gas charges and are presented as a percentage of total revenue:

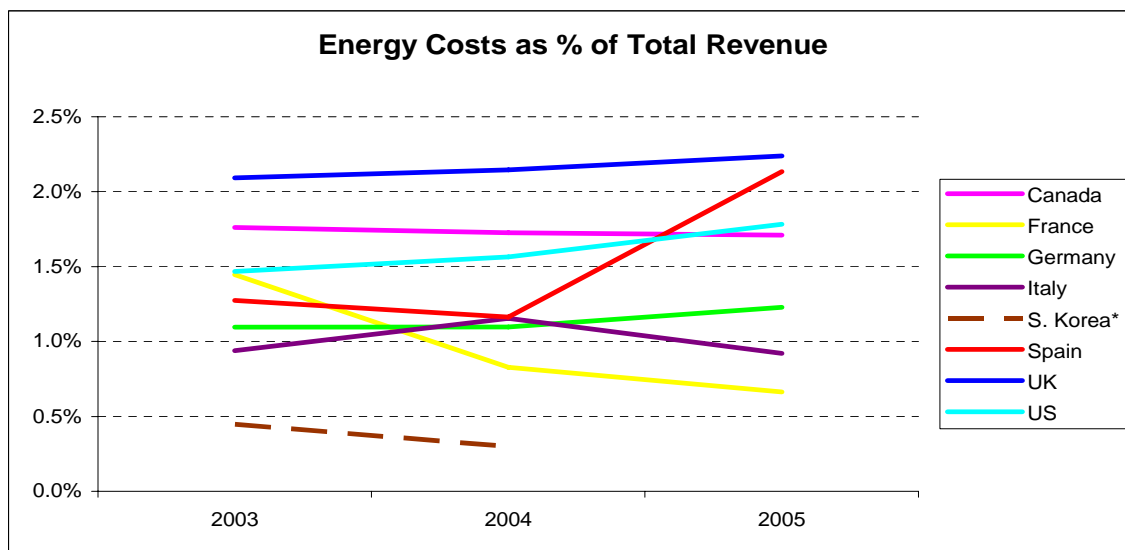


* Alberta data is for the 8 companies participating in this report and represents the year 2006. The Canada data includes the Alberta data.

** South Korea data refers to year 2003.

All other country data represents energy costs in 2005.

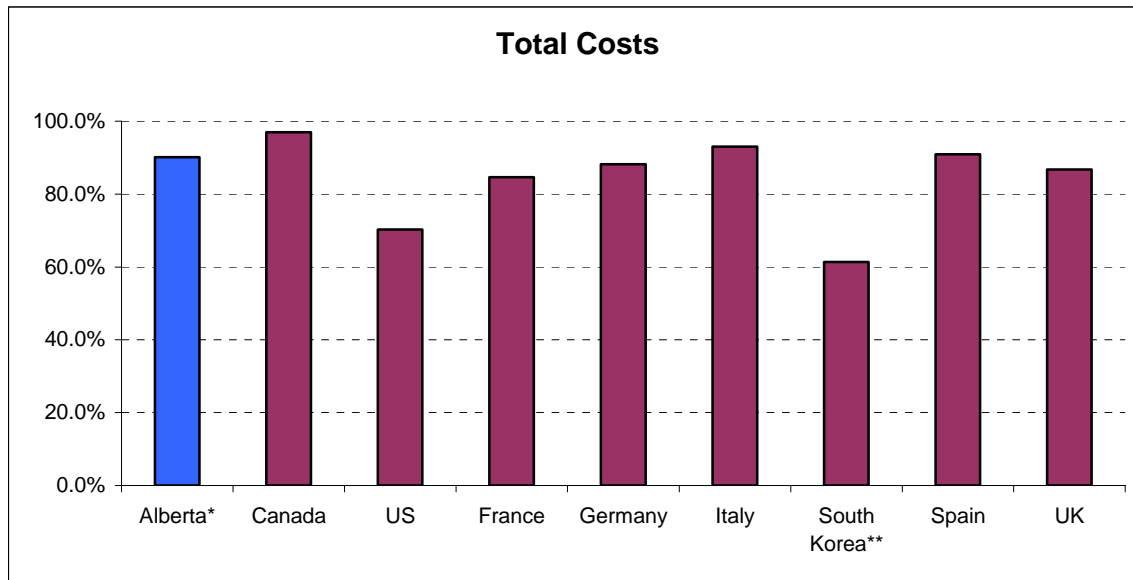
The proportion of energy costs in relation to revenues for South Korea, France, Italy and Germany are less than Alberta manufacturers participating in this Study. Comparing participating companies in Alberta to the rest of Canada, Alberta companies have lower energy cost proportions. However, ranging from 0.7% to 2.2% of total revenues, energy does not influence the bottom line significantly. Trend analysis revealed that proportional energy costs fluctuate up for Spain and down for France. All other countries show relatively stable energy cost proportions. South Korean trend is based on extrapolated data as Korean industry data was not available.



* Trend is based on an extrapolation of available 2004 data. No data exists for 2005.

6.6 Total costs

Total costs are presented as a percentage of total revenues:

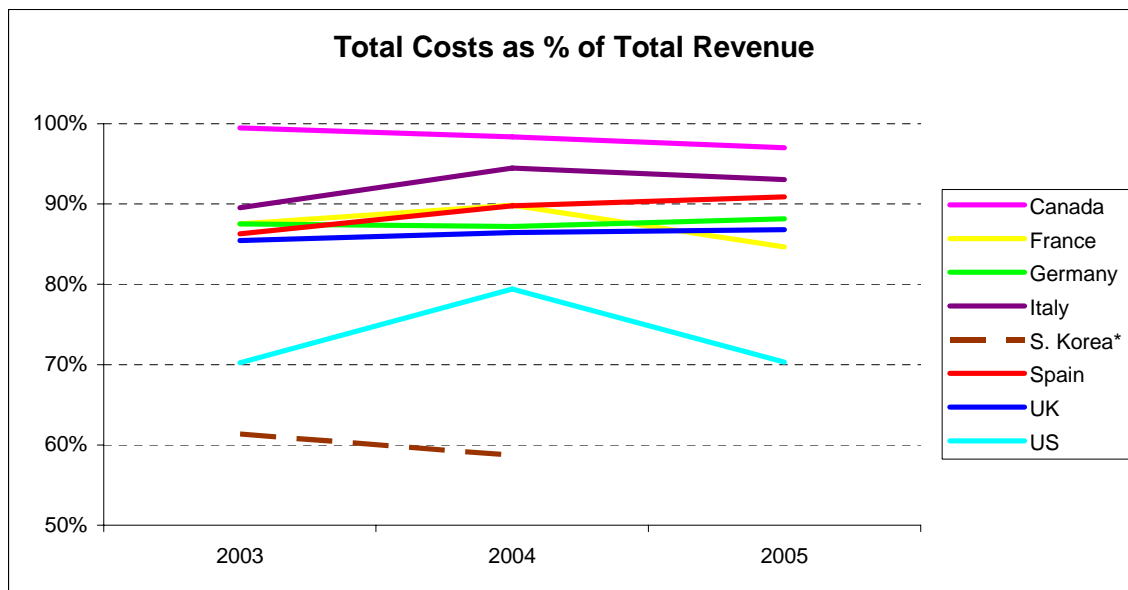


* Alberta data is for the 8 companies participating in this report and represents the year 2006. The Canada data includes the Alberta data.

** South Korea data refers to year 2003.

All other country data represents total costs in 2005.

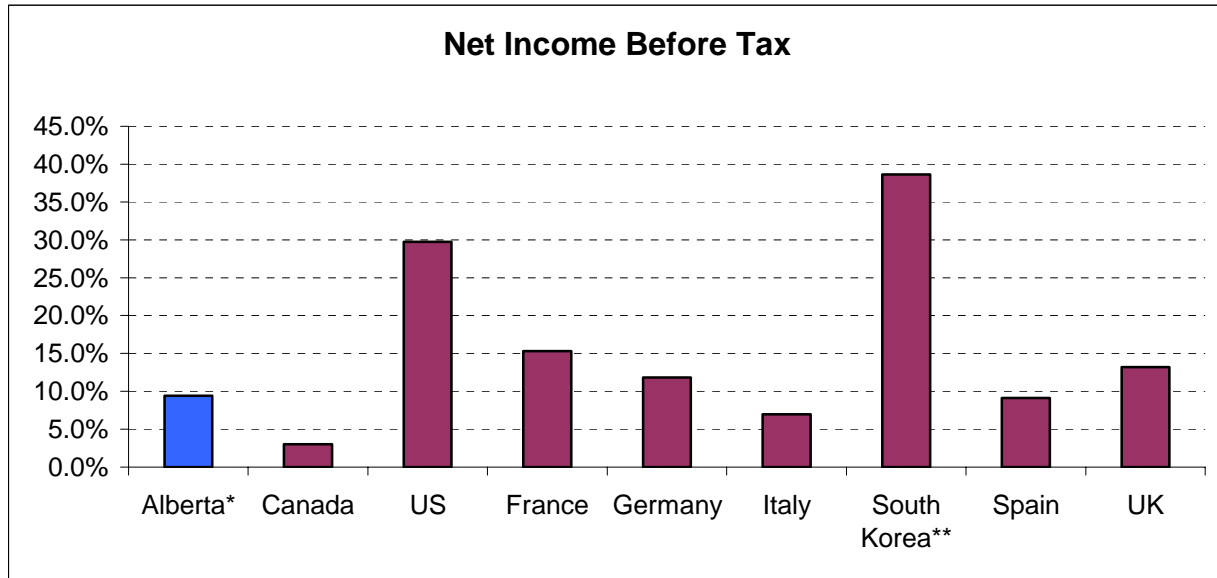
Canadian companies including Alberta participants in this Study reported the highest proportion of total costs of all comparable jurisdictions. South Korea posted the lowest proportional cost in the grouping, followed closely by the US. Trend analysis suggests that proportional costs are relatively stable. South Korean trend is based on extrapolated data as Korean industry data was not available.



* Trend is based on an extrapolation of available 2004 data. No data exists for 2005.

6.7 Net income before tax

Net Income before tax is presented as a percentage of total revenue:

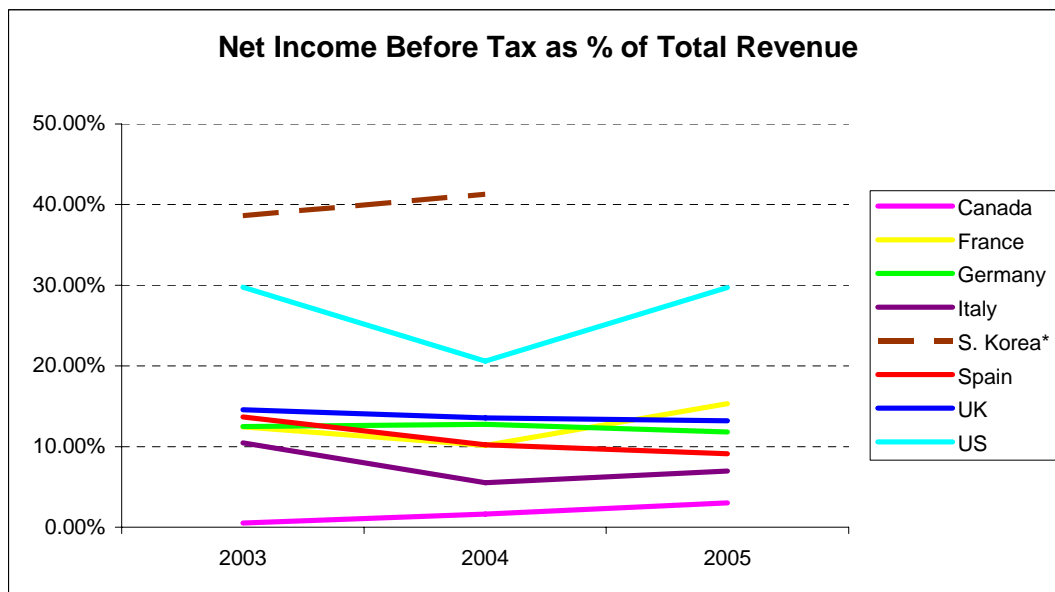


* Alberta data is for the 8 companies participating in this report and represents the year 2006. The Canada data includes the Alberta data.

** South Korea data refers to year 2003.

All other country data represents net income in 2005.

Consistent with the relative rankings for costs as a proportion of revenues (see Section 6.6), South Korea and the US are garnering the highest net incomes before tax as a percentage of total revenues. The Canadian industry as a whole generates the lowest proportional net income before tax. Alberta companies participating in this Study have proportional net income before tax similar to Germany and Spain. Net income before tax proportions trends follow patterns shaped by total revenues and total costs. South Korean trend is based on extrapolated data as Korean industry data was not available.



* Trend is based on an extrapolation of available 2004 data. No data exists for 2005.

7 Alberta Industry – Interests, Issues and Opportunities

7.1 Industry interests

The metal fabrication industry plays a critical role in the development of the oil sands and downstream processing in Alberta. As estimated by Alberta Finance and Enterprise, Alberta's metal products fabrication sector is forecast to generate approximately \$48 billion in revenues from 2005 to 2010. Contributing approximately 25% of the metal fabrication industry's overall shipments⁸, the tank, pressure vessel and heat exchanger manufacturing sector is poised to capture substantial growth opportunity.

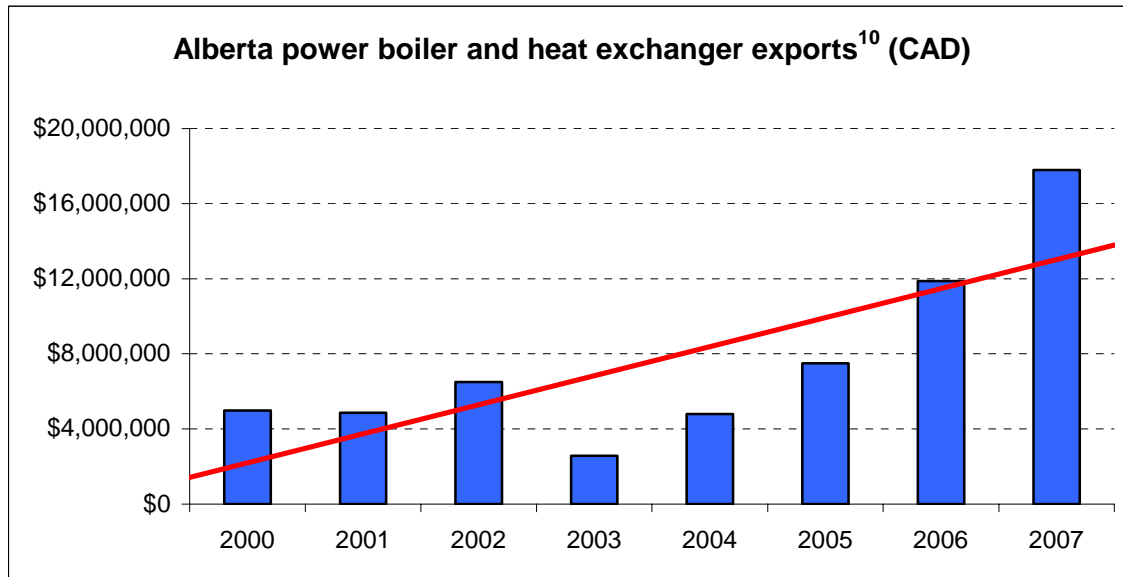
As revealed by the companies participating in this Benchmarking Study, this opportunity is credited to key strategic advantages that Alberta manufacturers have over their competitors:

- Proximity to end customers translates into three benefits:
 - Being close to the market they serve allows Alberta companies to develop stronger relationships with their customers leading to a better understanding of local market conditions and opportunities
 - The local industry is well positioned to provide timely and ongoing service and after market support to these customers
 - The sheer size of some of the required vessels combined with transportation considerations makes Alberta producers the logical choice for larger scale projects.
- Representing an industry with deep roots in Alberta's oil and gas industry, these companies have deep knowledge and expertise in manufacturing pressure vessels for local customers to meet Alberta's demanding conditions in terms of weather and safety, all resulting in products unmatched in quality and reliability by current competitors.
- In response to the cost pressures growing in the market for much of the last decade, many companies are already engaged in significant productivity improvement programs. Such efforts include the adoption of Lean manufacturing practices, expanded use of production and design software, labour development, building efficiency practices, etc. By taking on these practices promptly, many of Alberta's pressure vessel producers have protected and expanded their competitive strengths in both their domestic and export markets.

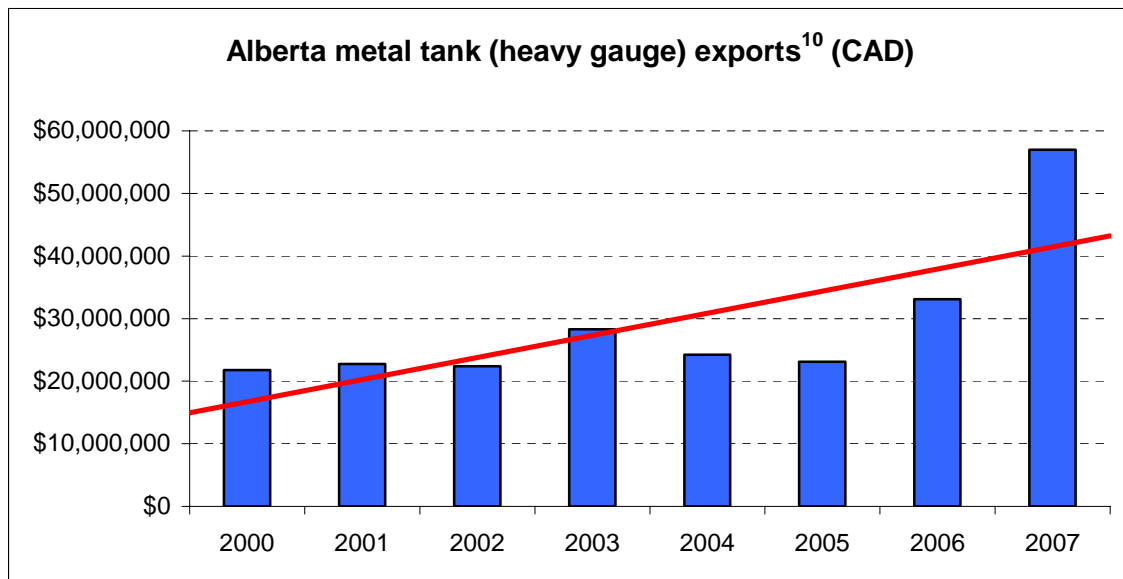
⁸ Government of Alberta, <http://www.alberta-canada.com/metalFabrication/expertise.cfm>

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Heavy-oil production globally is increasing and Alberta producers participating in the Study believe Alberta could be established as a market leader in this industry. Industry is responding to this potential as exhibited by the (almost) threefold increase in exports for the entire industry since 2000⁹:



Red line = trend line

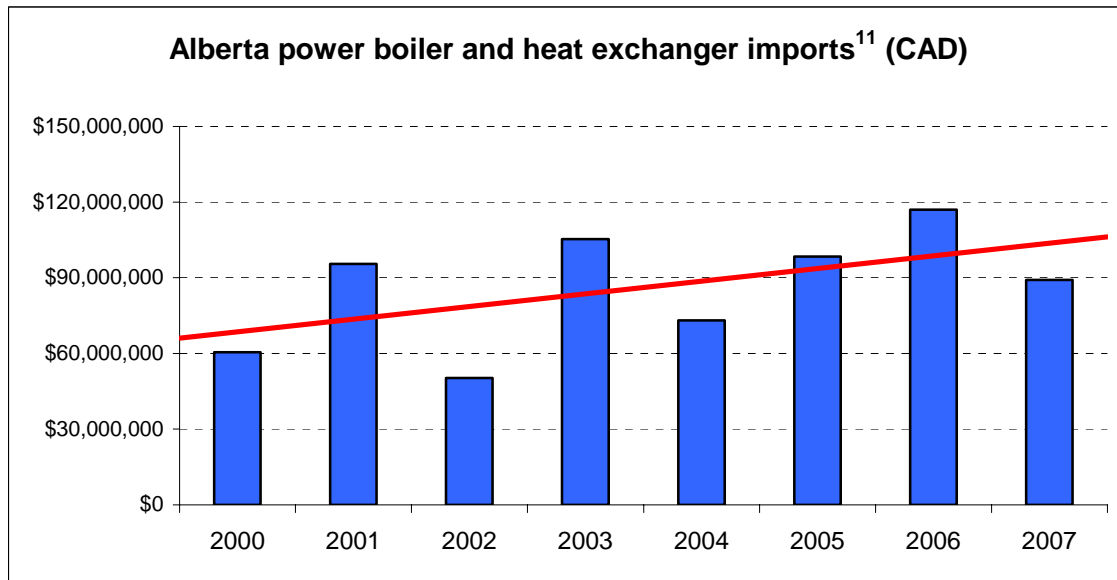


Red line = trend line

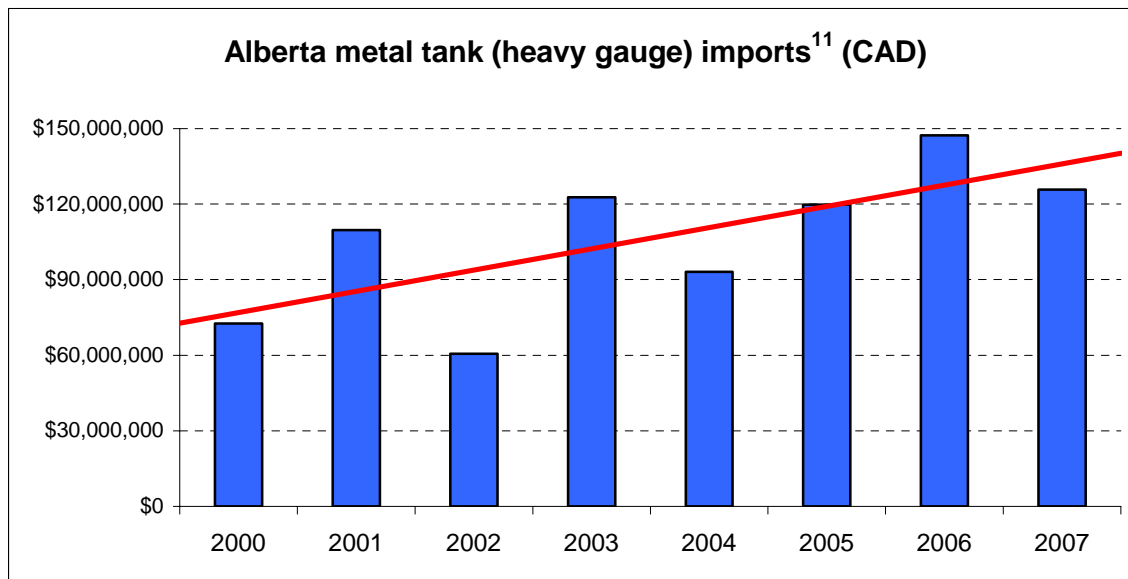
⁹ Industry Canada, Trade Data Online, <http://strategis.ic.gc.ca/epic/site/tdo-dcd.nsf/en/Home>

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Alberta's robust energy economy is also attracting interest from foreign competitors looking to expand their market share in Alberta. As a result, Industry Canada data¹⁰ shows that imports of pressure vessels and heavy gauge metal tanks have almost doubled in since 2000 (with spikes in 2001, 2003 and 2006):



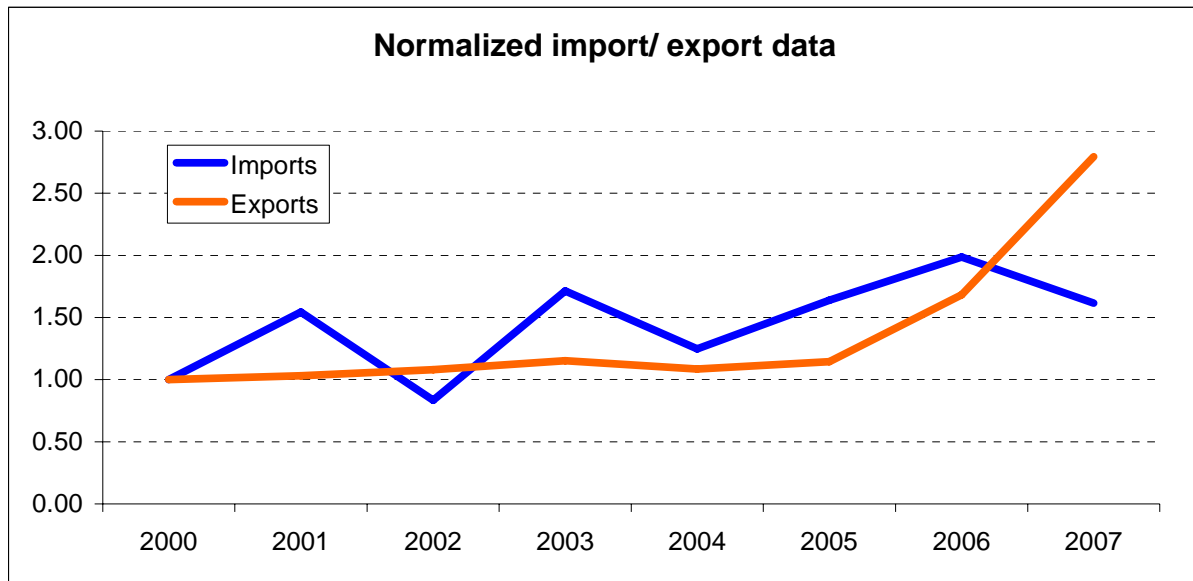
Red line = trend line



Red line = trend line

¹⁰ Industry Canada, Trade Data Online, <http://strategis.ic.gc.ca/epic/site/tdo-dcd.nsf/en/Home>

While imports and exports are increasing, Industry Canada trade data normalized using 2000 as the baseline, shows that Alberta power boiler, heat exchanger and heavy gauge metal tank exports are increasing at a much faster pace than imports between 2000 and 2007.



7.2 Industry issues and opportunities

Many of the challenges currently affecting the pressure vessel industry apply to the entire Alberta economy and derive from present economic conditions. Among these, the most important, as viewed by the Study participants, were:

- Overall increase in labour costs and shortage of qualified workers - especially B-pressure welders.
- Technical personnel are targeted by energy resource company recruiters – pressure vessel manufacturers find it difficult to compete with larger companies offering higher salaries and more comprehensive benefits.
- Access to certain raw material is costly due to the distance and related freight charges.
- Energy costs are higher in Alberta than other jurisdictions.
- Costs associated with adhering to Alberta's strong health and safety standards layer additional costs on Alberta products making it difficult often to compete in the international marketplace.
- Foreign exchange rates and the appreciating Canadian dollar significantly impact the bottom line of those manufacturers exporting products to the US and elsewhere. A strong Canadian dollar makes it difficult to remain competitive in international markets.
- Weaker foreign currencies compared to the Canadian dollar highlights the Canadian market as an attractive option for countries exporting to Canada.

Other challenges, specifically impacting the pressure vessel industry, were identified by Study participants as follows:

- B-pressure welding ticket requirements and overall labour costs are higher than other jurisdictions.

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- Adding to the labour costs, Alberta develops welders through an apprenticeship program where other jurisdictions do not and can train individuals “in-house” in accordance with the American Society of Mechanical Engineers (ASME) code.
- Participants believe that manufacturing standards and codes--e.g. ASME and Alberta Boilers Safety Association (ABSA)--for pressure vessels manufactured in Alberta are very stringent in comparison to manufacturing standards applied in competing countries. Higher manufacturing standards increases the cost to produce a pressure vessel in Alberta making it difficult to compete in the international market. In addition, pressure vessels manufactured in other countries may not meet Alberta quality standards and Alberta pressure vessel manufacturers are often hired to “re-work” products to meet Alberta standards. Alberta manufacturers would like to make their products more cost-competitive to compete on the international market thereby manufacturing the pressure vessel in its entirety, rather than simply doing the “re-work”.
- Industry sees the regulatory environment (e.g. labour laws, health and safety regulations, and ASME and ABSA codes) as complex and costly.
- Pressure vessel manufacturers are also of the belief that many Albertan buyers do not tender jobs to local companies as a result of the following assumptions that local companies:
 - Do not have enough expertise to meet client specifications/requests.
 - Do not have sufficient capacity to take on Alberta projects.
 - Are too costly and consequently do not tender jobs to local companies.

Most of the Study participants see companies, government and the industry association working collaboratively to address the issues identified by:

- Developing productivity and innovation services/support for the industry. Alberta companies are looking at new processes, products and technologies to compete globally. The support that they can draw from service providers increases speed and confidence as they penetrate the market.
- Increasing access to foreign labour by reducing or eliminating onerous immigration requirements and bureaucracy.
- Considering incentives/ tax credits where possible. Companies indicate the expanded Scientific Research & Experimental Development and Accelerated Capital Cost Allowance programs as examples of programs that could be used in developing a tax incentive to support industry interests in training skilled workers.
- Reducing the regulatory burden imposed through quality control standards. Exceeding ASME standards is seen to add costs for Alberta’s industry players that other constituencies can avoid.
- Reviewing/modifying the apprenticeship program to better suit industry’s needs. As the demands for more workers and higher skills increases, more expectations are placed on Alberta’s post-secondary schools to tailor their programs to industry needs.
- Using the opportunity to work closer with the client industry (oil and gas) to plan for and meet their anticipated needs (e.g. new development, latest technologies, environmental considerations, etc). Such supply chain planning would benefit all parties by reducing costs, increasing project speed and allowing for new efficiencies to emerge.
- Industry working cohesively in order to develop a strong provincial, national and global presence.

8 Summary

Alberta produced an estimated average of 1.25 million barrels per day of crude bitumen in 2006 with a 300% increase in bitumen production anticipated by 2020¹¹, thus creating a need for further bitumen upgrading within Alberta to maximize the value of the resource.

Based on this demand, Alberta is quickly becoming one of Canada's major manufacturing centers behind Ontario and Quebec. The pressure vessel manufacturing industry plays a critical role in development of oil sands and downstream processing. This presents a remarkable opportunity for Alberta's pressure vessel manufacturers to grow, but realization of this growth is not without issues or challenges that must be overcome to maintain competitive advantage. The opportunity also sets the stage for new competition to arrive from points across the country, continent and world.

¹¹ <http://www.alberta-canada.com/energyTechnologyServices/industryIntelligence.cfm>

APPENDIX I – ALBERTA BENCHMARKING PARTICIPANTS

Alberta Pressure Vessel Industry Benchmarking Study of 2006	
Participant List	
Altex Industries Inc.	Edmonton
Cessco Fabrication & Engineering Ltd.	Edmonton
Dacro Industries Inc.	Edmonton
Ensign Energy Services Inc.	Calgary
Exchanger Industries Ltd.	Calgary
MaXfield Inc.	Crossfield
Paintearth Energy Services	Calgary, Halkirk
Plains Fabrication & Supply	Calgary
Total Operations in Grouping	8

APPENDIX II – ALBERTA PRESSURE VESSEL BENCHMARKING QUESTIONNAIRE

Pressure Vessel Benchmarking Glossary	
Name	Definition/Explanation
Gross Revenue	Category includes total amount of revenue earned by the company for goods sold in relation to shop fabrication of pressure vessels. Includes revenue related to repairs.
Cost of Sales	
Wages - Production	Category includes direct production wages, CPP, EI, WCB, pension, benefits (health and dental), and all other employer portions of contractual obligations under union contracts; wages for superintendents should be included in this wage category, as opposed to General and Administrative Wages. Category does not include costs for attending or providing health and safety training.
Materials and supplies	Category includes total cost of raw materials for pressure vessels and welding consumables.
Engineering	Category includes total amount spent on wages, engineering software, cost of reference materials (books, standards, codes).
Subcontractors	Category includes all expenses related to hiring contract companies to manufacture pressure vessels (e.g. NDE, stress relieving, insulation, scaffolding, painting and coating, external cranes). Subcontractor costs should also include the company's cost to purchase WCB coverage for subcontractors that do not have their own WCB coverage.
Repairs and Maintenance	Category includes total amount of money spent by the company on scheduled maintenance and unforeseen repairs.
Cost to Own or Rent/ Lease Equipment	Category includes total annual payment for rent/ lease or depreciation of equipment attributed to manufacturing of pressure vessels.
Other	Category includes the summary of all remaining cost of sales expenses related to the production of pressure vessels.
Gross Margin	Gross Revenue - Cost of Sales
General & Administrative Expenses	
Wages - General and Administrative	Category includes non-production wages, CPP, EI, WCB, pension, benefits (health and dental). Category does not include production wages or wages for estimating, purchasing, etc.
Utilities - Gas	Category includes natural gas costs (including all taxes and incidental costs paid with gas bills) for entire facility.
Utilities - Electricity	Category includes electricity costs (including all taxes and incidental costs paid with electricity bills) for entire facility.
Travel and Lodging	Category includes expenses for meals, mileage, accommodations, transportation etc. Category does not include entertainment costs which are captured under advertising and promotion.
Advertising and Promotion	Category includes sales and marketing costs, including entertainment costs.
Insurance	Category includes total amount spent on insurance for business, vehicle, property, etc.
Training	Category includes all expenses related to time and materials used in the process of training. This cost category does not include a charge for union employee training required under union contract. The training charge under the union contract is captured as part of Wages - Production. Also, category does not include health and safety training expenses which must be included as part of Health and Safety.
Health and Safety	Category includes wage and supply costs to carry out the health and safety program. This category includes the cost to deliver and attend health and safety training (tool box briefings, etc.).
Cost to Own or Rent/ Lease Property and Production Facilities.	Category includes total annual payment for rent/ lease or depreciation of property and production facilities.
Property tax	Category includes total annual payment of property taxes.
Finance	Category includes all costs of borrowing related to establishing letters of credit, entering into hedging arrangements, interest expense (including lines of credit, capital loans, inter-company loans), bank charges, etc.
Legal and Professional Fees	Category includes ASME dues, ABSA dues, accounting and audit fees, legal fees, employee professional fees, etc.
Other	Category includes summary of all remaining General & Administrative Expenses.
Net Income (Loss) Before Tax	Gross Margin - General & Administrative Expenses

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Name	Definition/Explanation
Other operational information	
Total Manufacturing Labour Hours	Category includes total number of hours worked on the shop floor by all employees (i.e. hourly and salaried) in 2006 fiscal year.
Number of Hourly Employees	Category includes the total number of hourly employees working on pressure vessels calculated as an average full-time equivalent (FTE) in 2006 fiscal year.
Hourly employees - total hours worked	Category includes the total number of hours worked by hourly employees in 2006 fiscal year.
Number of Salaried Employees	Category includes total number of salaried employees in 2006 fiscal year.
Salaried Employees - Total Hours Worked	Category includes the total number of hours worked by salaried employees in 2006 fiscal year.
Manufacturing Area	Category includes total square feet of useable manufacturing space used for the reporting period - 2006 Useable manufacturing space includes all covered work areas even if they are not fully enclosed.
Employee Turnover - Hourly Voluntary	Category includes the total number of hourly employees that voluntarily left employment within the 2006 fiscal year.
Employee Turnover - Hourly Involuntary	Category includes the total number of hourly employees that had employment terminated within the 2006 fiscal year.
Employee Turnover - Salaried Voluntary	Category includes the total number of salaried employees that voluntarily left employment within the 2006 fiscal year.
Employee Turnover - Salaried Involuntary	Provides the total number of salaried employees that had employment terminated within the 2006 fiscal year.
Apprentices	Category includes the total number of apprentices employed on a full-time equivalent basis in the 2006 fiscal year.
Journeyman	Category includes the total number of journeymen employed on a full-time equivalent basis in the 2006 fiscal year. Includes B-Pressure welders.
B-Pressure Welders	Category includes the total number of B-pressure welders on a full-time equivalent basis in the 2006 fiscal year.
Production Backlog	Category includes the total value of purchase orders/ contracts waiting production as at the end of fiscal year 2006 (i.e. potential backlog).
Scientific Research and Experimental Development	Category includes all Scientific Research and Experimental Development (SR&ED) claims per income tax filing for 2006 fiscal year.
Trade Accounts Receivable (As at December 31, 2006)	Category includes money which is owed to a company by a customer for products and services provided on credit after the invoice has been issued.
Trade Accounts Payable (As at December 31, 2006)	Category includes money which a company owes to vendors for products and services purchased on credit.

APPENDIX III – INDUSTRY DATA SUMMARY

Canadian dollars		2003	2004	2005
Canada	Revenue	1,818,953,000	1,922,440,000	2,177,123,000
	Employees	10,515	10,182	11,636
	Hours worked			
	Costs - Wages	1,256,190,000	1,349,709,000	1,500,376,000
	Wages & Salaries	521,606,000	508,019,000	574,137,000
	Energy	32,038,000	33,160,000	37,212,000
US	Revenue	11,302,845,230	9,954,308,003	10,526,715,202
	Employees	48,201	46,735	45,929
	Hours worked	70,939,000	66,686,000	67,929,000
	Costs - Wages	5,046,623,510	5,202,359,705	4,754,351,113
	Wages & Salaries	2,727,012,072	2,547,000,360	2,456,738,300
	Energy	165,891,351	155,685,430	187,671,994
France	Revenue	656,405,500	682,570,740	704,713,770
	Employees	3,542	3,458	3,388
	Hours worked	6,716,993	6,557,696	6,424,949
	Costs - Wages	423,579,260	468,034,650	460,153,500
	Wages & Salaries	141,562,150	139,682,880	131,860,380
	Energy	9,490,200	5,658,450	4,676,970
Germany	Revenue	2,686,042,940	2,903,593,200	2,605,223,160
	Employees	13,542	12,738	12,018
	Hours worked	20,840,935 :		18,474,010
	Costs - Wages	1,644,809,830	1,853,223,210	1,712,072,760
	Wages & Salaries	676,334,920	647,650,020	553,089,420
	Energy	29,419,620	31,848,990	31,984,440
Italy	Revenue	2,191,603,520	2,561,822,820	2,603,110,980
	Employees	9,326	10,006	10,264
	Hours worked	15,735,000	17,764,000	17,398,000
	Costs - Wages	1,616,971,910	1,971,888,990	1,990,880,520
	Wages & Salaries	324,881,180	418,725,300	406,745,520
	Energy	20,562,100	29,585,610	23,988,330
Spain	Revenue	1,814,051,730	2,084,734,650	2,092,717,770
	Employees	14,922	14,776	14,762
	Hours worked	26,067,338	25,533,404	25,861,634
	Costs - Wages	1,046,769,060	1,333,777,500	1,343,044,740
	Wages & Salaries	495,862,950	513,302,250	514,617,570
	Energy	23,092,820	24,250,500	44,657,520
UK	Revenue	1,058,631,810	1,190,376,210	1,044,925,620
	Employees	5,010	5,453	4,887
	Hours worked	9,531,457	10,975,928	7,146,608
	Costs - Wages	571,310,040	672,870,540	586,129,950
	Wages & Salaries	310,962,220	330,453,480	297,515,640
	Energy	22,143,800	25,543,860	23,384,850
S. Korea	Revenue	1,050,168,000	N/A	N/A
	Employees	6,151	8,158	N/A
	Hours worked	N/A	N/A	N/A
	Costs - Wages	489,216,000	890,624,000	N/A
	Wages & Salaries	150,528,000	219,248,000	N/A
	Energy	4,704,000	5,680,000	N/A