
- FINAL REPORT-

**NOVA SCOTIA
MANUFACTURED HOUSING INDUSTRY STUDY**

Submitted to
**ATLANTIC HOME BUILDING AND
RENOVATION SECTOR COUNCIL**

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EXECUTIVE SUMMARY

Nationally, the manufactured housing industry represents between 1.5% and 2% of the total residential construction industry in Canada.

The sector has grown at an average annual rate of 3.5% during the past decade as is worth some \$1.5 billion annually to the Canadian economy.

A total of 15,000 single family and 2,000 multi-units are manufactured in Canada each year with 20% destined for export and 80% destined for domestic sale.

This study suggested that:

- Factory built homes presents a significant opportunity to achieve labour productivity gains in the residential construction industry.

And

- Manufactured home building may present the most significant opportunity to overcome labour shortages in the residential construction sector.

We suspect that labour market pressures and competing career choices, out migration of youth and other demographic challenges will continue pressure the construction labour market. Combined with the need for productivity gains, we anticipate that manufactured home building will continue to grow and that off-site construction work will provide homebuilders with an option to overcome limited supply of site build workers.

1. Develop interactive web resources that appeal to youth. This should include video clips of work in the field and interviews with employers and employees who enjoy their work.
2. To recruit amongst the growing number of aboriginal and minority youth who are graduating from high school, contact band councils and community youth programs to schedule recruiting presentations at local schools and community centres. Other non-traditional or under represented labour sources include females.
3. Explore sources of funding support from government, develop the business case for company-funded professional development in specific occupations, and develop an industry-coordinated professional development program beyond the provincial apprenticeship programs.
4. With respect to draftsmen designers, local employers should work closely with the NSCC Co-operative Education Program. The two-year Drafting-Architectural program seeks employers to match with students between the first and second year of the program. (The program seeks paid

- employment for its candidates and the innovative nature of the factory-built construction subsector could be attractive to students seeking a specialized niche.)
5. Local employers in Atlantic Canada are advised to support apprenticeships for mobile crane operators through the New Brunswick Department of Post-Secondary Education, Training and Labour Apprenticeship and Certification Branch.
 6. Conduct a benchmarking study of the sector in larger jurisdictions to see what experiences they have had with respect to recruitment, retention, education and skills development recently. Often issues encountered in larger centres of Canada are a precursor for trends that will move into the Atlantic region.
 7. Research the potential of retraining people in the workforce who are interested in construction, but are constrained by other commitments.
 8. More information sharing regarding the needs of businesses will support delivery of training.
 9. Develop proposals and advocate for government-supported financial assistance programs to help people re-train for construction trades.
 10. Survey industry employers to determine the type and extent of hands-on, technology-specific training that is not currently being provided by the NSCC.
 11. The AHB&RSC should then meet with the NSCC School of Trades & Technology to determine if the desired hands-on experience is generic enough to the construction industry to justify costs for enhanced or new programming.
 12. Advise employers to contact the OEMs and determine if they provide training and support for their products. In some cases, the purchase agreement for equipment and service contracts include options for sending employees to central locations where the equipment companies sponsor training.
 13. The federal and provincial governments have discontinued direct support for technology training, however the AHB&RSC should consider advocating re-establishment of technology training for employees in conjunction with the Association of Sector Councils at the provincial and national levels.
 14. The AHB&RSC, along with other sector organizations, could create a volunteer mentor program ranging from visits to schools, Internet chat

- rooms and discussion boards, and on-the-job mentoring for new and part-time entrants.
15. Getting the trades back into the schools and colleges is the most important initiative to alleviate current and projected labour shortages.
 16. "It is imperative that provincial apprenticeship authorities recognize and designate specialty residential construction trades that currently are not recognized among the traditional construction trades."
 17. Local associations should urge more apprenticeship reform to organize the carpentry trades and speed up the process for modular certifications.
 18. Local HBAs should urge provincial governments to consider funding contributions for in-factory training in the skills required to support manufactured housing.
 19. Apprenticeship boards should give qualified trades workers recognition as potential mentors to apprentices as long as access to journeypersons exists within an organization.

Interviews completed during this research indicate that manufactured homes will continue to be an important housing option in rural areas where labour market constraints are more apparent than in urban settings. Anecdotal results suggest that the manufactured homes will continue to be an important entry level housing option. Other market segments that are expected to draw on the manufactured housing industry include rural independent living for seniors. Townhouse development may provide the best opportunity for entry into urban settings where multi-home construction in close proximity by site builders can achieve the same economies of operations found within factories (i.e., site building remains a competitive option in urban settings).

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1. INTRODUCTION

Recent demand for manufactured housing¹, and more generally, manufactured components of homes (e.g. pre-assembled kitchen cabinets, pre-engineered roof trusses) impacts the traditional residential construction by replacing on-site construction labour with labour located at manufacturing facilities. As the industry seeks to improve productivity, construction related activities have shifted from the construction sector into the manufacturing sector. From pre-hung doors to pre-assembled kitchen cabinets to pre-engineered roof trusses, even on-site construction cannot claim to be 100% on site.

Factory built housing is the extreme, with as much as 90% of home construction taking place in a location off-site, away from where the home is ultimately located. The result is a significant change for the labour market. Factory built residential construction work is fundamentally different from the highly mobile project work that tracks the real estate development and characterizes the traditional onsite sector. Builders of factory homes work in fixed locations using an 'assembly line approach' to organize construction activities.

Across Canada, it is estimated that the factory-built housing sector is about 1.5% the size of the residential construction sector. However, with an output of about \$1.2 billion (2004) and an annual unit growth rate of 3.2% per year (1993 – 2004) the sector continues to become a significant part of the Canadian economy.

The operating environment of the factory-built housing sector brings management and labour skills issues that are unique and differ from the on-site residential construction sector. For example:

- The production line process allows specialized labour, machinery and tools that can be applied continuously on specialized tasks.
- Factory workers can be trained in more task-specific duties and or rotated through several task specific duties within the shop.
- The factory homebuilders' work environment is more akin to manufacturing where the workers go to a single location rather than follow projects to the site of the eventual home location.

Labour and supervision issues are also somewhat different in the factory-built sector in that there is an opportunity for supervisors to become more task specific and potentially manage a larger group of workers relative to the on-site sector.

1.1. STUDY RATIONALE

There is a consensus in the research that all sectors of the economy will be facing tighter labour markets in the coming decades. Within the construction sector,

¹ "Manufactured housing" and "factory-built housing" are used interchangeably. The manufactured housing sector includes the production of "manufactured homes" and "modular homes", as defined by CMHC.

several publications (see “2. Literature Review – Manufactured Housing”) and our interview results point to the emerging or existing labour shortage of skilled trades as an increasing problem for the residential construction sector.

Technological change and globalization are increasing the demand for skilled workers while the aging work force and decline in birth rates are contributing to the overall decline in the supply of labour.

Within the construction sector in general, the supply of labour in the skilled trades is further challenged by a declining rate of entry by youth - which may be due to their lack of awareness of the skilled trades as career option. Over the past few decades, there also appears to have been a pre-disposition to direct youth into careers other than the skilled trades in general and the construction sector in particular – contributing to this, no doubt, is the long period of high unemployment and instability in this sector through the 1980s and into the late 1990s. One message for the residential construction industry; it needs continued promotion to effectively reach students and others to raise the awareness careers options in trades.

Nova Scotia faces an additional pressure on labour supply through out-migration, where youth are moving to provinces with more opportunities for work and higher paying jobs. Without more specific information on what improves retention of the workforce, the Nova Scotia residential construction sector faces the continued reality wherein it effectively trains workers to take advantage of opportunities in other jurisdictions.

In the context of these pressures, factory home building is perhaps the most significant opportunity within the residential housing sector to make substantial gains in terms of labour productivity because of the controlled environment and opportunity for growth. It is also perhaps the most significant opportunity for the residential housing industry to overcome current and/or anticipated labour shortages. This is because factory building offers builders the option of labour saving construction alternatives to support a much more limited degree of on-site activity to deliver homes to end consumers. The spectrum of labour saving options is can range form panel construction to the full modular construction of entire homes.

These labour savings benefits may be one of the major reasons why the factory-built sector is emerging as a growing component of residential construction. Anecdotal comments suggest this is the case – that shifts toward factory building are motivated in part by limitations on available on-site labour, particularly in rural areas. Another source for in-factory efficiencies is the control of the production process. Within the factory environment there is much more control of what happens relative to onsite construction. CAD and engineering departments detail every aspect of the construction process according to the requirement of CSA and within an efficiency manufacturing process. Relative to onsite construction, the assembly process is much more prescriptive and these is less room for error and misinterpretation of plans.

Continued integration with the on-site residential construction sector could be an important new source of growth for the factory-built sector and an increasing share of all home construction activity – and if not overall growth, avoidance of other labour supply/demand adjustment alternatives (e.g., wages/price increases and or delays in delivery of new homes).

However, productivity gains in the factory-built subsector of residential home building should not be expected to offset the increase in labour market shortages over the next five years. We may see more significant effects further in the future, as technology improves and new strategies for recruitment and retention of labour into the subsector are implemented.²

It is difficult to identify the point at which productivity gains, demand and other market conditions are such that a manufacturing plant is justified in Nova Scotia. For the moment, it would seem that the demand for manufactured housing in the region could be effectively supplied through existing production capacity in New Brunswick. However, rising transportation costs may tend to influence the geographic reach around which Atlantic Canadian based plants now distribute their products.

The role of the Atlantic Home Building & Renovation Sector Council (AHB&RSC) is to act as a vehicle to elicit participation from all sectors of the residential homebuilding and renovation industry for the overarching purpose of identifying and addressing human resource issues. In fulfilment of its mandate, the AHB&RSC commissioned a study of the Manufactured Housing Industry in Nova Scotia with a view toward assessing the impacts of growth in the manufactured housing industry.

1.2. PROJECT PURPOSE AND GOALS

Residential construction human resource planning relies on input from associations such as AHB&RSC and their ability to draw the information necessary from sector participants so that this can inform policy in a timely manner. In this way, training needs can be accurately identified and actions taken to meet both present and future HR needs in a timely manor. To better understand the growing Manufactured Housing Industry in Nova Scotia, this study set out to analyse the scale and scope of the sector and document the current and future human resource needs.

Accordingly, the study was largely based on secondary sources from across Canada and augmented through interviews with industry representatives within the Atlantic Region. The following areas were research goals for the study:

² See "A Revised Approach To A Human Resource Development Action Plan For The Residential Construction Industry," April, 2007 provided by CHBA

- Highlight the productivity of the workforce and use of equipment/technology, and implications for the competitiveness of the sector;
- Document issues around the recruitment and retention of workers;
- Identify areas where there are imbalances in the demand and supply of labour and, where possible, highlight the extent of labour imbalances;
- Research career development and career paths in the industry;
- Highlight the role of training, apprenticeship and certification systems within the sector;
- Document the mobility of workers between factory-built housing and other construction industry sectors; and
- Document the role of Prior Learning Assessment and Recognition (PLAR).

An additional purpose was to help determine current and projected education and training needs related to the factory-built segment of the construction sector, in order to assist the industry in planning the development and delivery of course/workshop offerings.

The study provides an overview of the size of the industry in Nova Scotia and an overview of the labour force in the factory-built housing sector, identifying key human resource issues facing the sector as well as the scale, structure and growth potential of the industry in Nova Scotia. Study findings and recommendations are provided to support long-term human resource planning for this emerging segment of the residential construction industry.

1.3. STUDY METHODOLOGY

Given the limited activity associated with a narrow definition of factory built residential home construction sector in Nova Scotia, a broader view was taken to consider activities that present alternatives to traditional on-site construction. Therefore, this study includes producers of kit homes, log homes, timber frames, wall panels as well as factory homebuilders.

We have examined the information available to us, which described the firms, sales and employment within all segments of the manufactured housing sector in Nova Scotia and Canada. Our research has allowed us to examine and identify the labour force characteristics, occupational profiles, skill needs and training capacity, transferable skills and human resource challenges specific to the sector.

Our research efforts began with reference materials available on the Manufactured Housing Industry in Atlantic Canada. Recent publications from such sources as Altus Clayton, Statistics Canada, Nova Scotia Community College and a variety of construction associations were referenced in this study (See **Appendix A: Bibliography**).³

³ Through this material we identified a clearer definition of "manufactured houses" was required, for the purpose of this study, as there are no modular home producers in Nova Scotia. It was

The Manufactured Housing Association of Atlantic Canada (MHAAC) held their semi-annual meeting in September 2007. Our team was invited to present the current study purpose to the regional industry representatives. During the meeting, our team presented background information on the study, handed out a brief survey and asked representatives to contact us by phone, email or through an AHB&RSC web link to contribute their thoughts towards study. Each person attending the meeting received a postcard displaying the name of the study and contact options to make it easier for them to contact the study team.

We also met with students from grades 10, 11 and 12 at a local high school, to identify their interest in construction trades, find out what may be influencing their career decisions and where they thought they would like to be working (i.e., in Nova Scotia or not). It was clear from this that trades, among a variety of competing career options, did not figure prominently among the students we met. This anecdotal information confirms the results of similar lines of questioning assessed in the Nova Scotia Apprenticeship Board's 2004 *Youth Decision Report*.⁴

In September 2007 a WoodLINKS presentation took place, coordinated by the Department of Education. Industry representatives attended, along with Nova Scotia Community College spokespeople and a representative from our research team. The information shared facilitated discussions that emphasized the needs of the industry and what the NSCC is doing to address those needs.

Work from late September and into October involved development and fine-tuning of the Interview Guide and, in consultation with the Sector Council, identification of businesses we were to contact (see **Appendix B**). Interviewing began in late September and concluded in late May.⁵

1.4. REPORT ORGANIZATION

The remainder of this report is organized within the following sections:

- **Section 2 - Literature Review** - provides a snapshot of the documents referenced for this study.
- **Section 3 – Industry Profile** provides a statistical and narrative description of the manufactured housing industry in Canada with special attention paid to the Nova Scotia industry.

agreed that makers of kit homes, log homes, timber frame homes and wall panels would be included in our research of the Manufactured Housing Industry Study.

⁴ Nova Scotia Apprenticeship Board; Youth Decision Report; 2004

⁵ Industries contacts were mapped-out in consultation with the sector council, and contact information compiled by our team industries (**Appendix B**).

- **Section 4 – Making Manufactured Homes** describes the processes involved in manufacturing houses.
- **Section 5 – Profile of Workers** describes the characteristics of the workers involved in the sector.
- **Section 6 – Recruitment and Retention** discusses the challenges with industry recruitment and retention.
- **Section 7 – HR Planning and Development Issues and Potential Solutions** presents findings discussed in terms of information needs, emerging HR issues, potential solutions to some of the HR challenges and our suggestions for next steps.

2. LITERATURE REVIEW – MANUFACTURED HOUSING

Given that the primary basis of this study was secondary research, we included several documents in the literature review. These are presented below.

Profile and Prospect of the Factory-Built Housing Industry in Canada, CMHC and Altus Group, March 31, 2006

Altus found that the factory is playing a pivotal role in the Canadian homebuilding industry and has done so for close to a century. From prefabrication of housing components to the large-scale production of whole homes, the factory has contributed to the success of the homebuilding industry by reducing construction time and enhancing productivity and performance. The factory-built housing sector in Canada, while small, is an important component of the Canadian homebuilding industry. A successful factory-built housing sector has the potential to advance the Canadian homebuilding industry by improving prospects for Canadian housing exports, meeting environmental challenges, and contributing to innovation in the homebuilding sector.

Altus Clayton's report combined principal data on the size and scope of the factory-built housing industry with interviews and field visits to provide a broad examination of the factory-built housing industry in Canada. As well as examining the current state of the factory-built sector, forecasts and prospects for the future are incorporated and discussed. The outlook portion of the report includes analysis of future possibilities for technology and production methods and integration between the factory-built and on-site built sectors.

"Ontario's Value-Added Wood Products Market Potential in the U.S. Great Lakes States" Peter Norman, Altus Clayton in association with Woodbridge Associates Inc., July 2003

This study identified dominant and growth products within three wood product groups: Wood building Components, Millwork and Factory-built Structures to help Ontario's manufacturers identify intermediate and end-use markets for the dominant and growth products to increase trade between Ontario and the United States.

- Volume 1 provides detailed analyses of export market opportunities in the Great Lakes region for the three sub-groups of Ontario's wood products manufacturing industry;
- Volume 2 summarises data describing the size, shipments and products-mix of Ontario's wood products industry.
- Volume 3 presents an overview of Ontario wood product exports to the Great Lakes.

- Volume 4 gives additional details of the specific export opportunities and an analysis of the economic, financial and policy implications of the growth projections.

The study finds that by using factory-built homes or components, site builders could lower their unit costs substantially. In the 1990s, construction costs per square foot (excluding land development and below-grade excavation) were roughly 30-50% lower for factory built components than their equivalent site-built product. More on-site builders are expected to adopt prefabrication in constructions to continue cutting their production costs.

The factory-built housing industry can save costs because:

- it is not affected by delays caused by inclement weather;
- less time is spent relocating trades labour between sites;
- technicians, craftsmen and assemblers can more easily be integrated into a work team;
- less inventory is required and it can better controlled;
- materials are protected from theft and weather-related damage;
- some materials are more easily worked in a climate controlled factory setting⁶;
- the application of assembly line techniques helps ensure that labour, machinery and tools are continuously employed; and
- energy costs per unit of output are reduced due to the more efficient assembly line process.

"Using Prefabrication in Housing"; CMHC, Currently on CMHC Website:

<http://www.cmhc.ca/en/inpr/imhoaf/afhoid/cote/usprho/index.cfm>

The factory setting enhances productivity through a combination of quantity purchasing of materials, mass production assembly techniques and the use of less skilled labour. The Canadian industry applies prefabrication techniques to manufacture housing components, modular housing, and manufactured housing.

The use of prefabricated components and modules in residential construction:

- helps reduce construction time, resulting in lower labour cost;
- allows for year-round construction; and
- allows for greater computerisation of the production process, which reduces wastage increases labour productivity.

Improvements in labour productivity can be dramatic. For example, by using roof panels, such as those made of Oriented Strand Board, construction time can be shortened and the labour required to roof a building can be reduced by 30% to 40%. Manufactured housing, which is completely factory-built, costs approximately 35% less than conventionally constructed housing.

⁶ For example, the curing of asphalt on roofing shingles is improved in heated factory settings.

"Towards Industrialized Construction"; D.W. Finn, Construction Canada, May 1992

The article summarizes some innovations in the areas of materials, computers, robotics and construction techniques that can improve building quality.

This report categorised innovative building materials fall into two general categories: new and improved materials (such as high performance concrete composites), and prefabricated assemblies of materials (such as insulation and exterior cladding).

Innovations in Computer Aided Design (CAD) packages allow building designers to analyze buildings for heat loss and generate 3D interior mock ups, resulting in more advanced design.

Computer controlled equipment cut and shape, position and connect members to form structural frames with significantly improved dimensional consistency compared to on-site construction techniques. Computer controlled equipment can also paint, trowel concrete, handle materials, and inspect finished prefabricated components for flaws.

The report concludes that innovations in materials and prefabricated assemblies combined with future labour shortages will accelerate the role of the manufactured housing sector in the construction industry.

"An Energy Efficiency Action Plan for the Factory-Built Housing Industry: Consultation Report"; Canadian Manufactured Housing Institute, May 2004

The report presents recommendations for industry action related to energy efficiency. The recommendations include:

- co-operation between industry, and government to develop an energy efficiency rating and labelling program for new homes;
- acting in the near-term to ensure that a single, national, new home labelling program is created;
- working with others to ensure that a new home rating and labelling program is based on a balanced and sustainable partnership model; a "best practices" technical handbook for energy efficient retrofitting of older surface-mounted homes should be developed to support community operator and homeowner decision-making.

"The Future of Manufactured Housing"; Kimberly Vermeer and Josephine Louie, Harvard University: Joint Center for Housing Studies, January 1997

The report focuses on the manufactured housing industry in the United States. The article is divided into five sections: Manufactured Housing: Origins and Evolution; Current Manufactured Housing Stock Characteristics; the Occupant Characteristics; Cost Issues related to initial cost and later maintenance and the Future Trend in the industry.

The report finds that average sales prices for new, single-family units have historically been nearly four times higher than prices for new manufactured

homes. Consequently, owners of factory-built homes tend to have lower financing costs.

"Simulation Modelling of Manufactured Housing Processes"; Ayman Abdallah Abu Hammad, the University of Cincinnati: Department of Civil and Environmental Engineering, 2001

This MSc thesis identified ways that the productivity of a manufactured housing factory could be improved.

The research concludes that several techniques could improve the factory productivity such as line balancing of station processes, line balancing of the assembly line and partial automation of the congested stations within the assembly line.

"Manufactured Housing Production Process"; Ayman Abu Hammad, University of Cincinnati, Makarand Hastak, Purdue University and Matt Syal, Michigan State University, September 2002

This report describes the development of a simulation model designed to help identify process bottlenecks and system productivity opportunities at manufactured housing plants.

"Pilot Study: Applying Lean Principles to Factory Home Building"; Prepared by the Manufactured Housing Research Alliance for the U.S. Department of Housing and Urban Development, July 2007

During the pilot study lean production techniques, appropriate for factory-built housing, were developed and implemented. Lean production strives to eliminate a wide range of waste (time, cost, materials, etc.) and creating a culture of continuous improvement.

Nine manufactured and modular home production plants participated in the project. Results indicate that lean production techniques can provide striking efficiency, quality and other improvements for housing plants. Production departments experienced productivity improvements ranging from 10% to over 100%. The lean production activities lead to improved morale and communication between management and workers.

"Factory Built Housing Roadmap (Including Recommendations for Energy Research)"; Prepared by the Manufactured Housing Research Alliance for the U.S. Department of Housing and Urban Development, January 2006

This is one in a series of Roadmaps created to guide housing industry decisions about research and development investments. It suggests several research initiatives related to the home structure, the production plant, the homebuilding site, the manufactured housing market, the consumer services/needs and energy savings.

It also explains the trends and forces that shape the manufactured housing industry such as the convergence and emergence of modular and HUD-code manufactured housing, the shortage of skilled labour, the emphasis on energy

efficiency and the increasing coordination among all stages of the building process.

"Factory and Site-Building: A Comparison for the 21st Century"; Prepared by NAHB Research Center, Inc. for the U.S. Department of Housing and Urban Development, October 1998

This study compared the three main housing approaches—site-built housing, manufactured housing, and modular housing, described the growth in the manufactured home market and identified efficiencies in the manufactured housing sector that can be applied to site-built or modular home construction.

A cost comparison of the three types of housing construction found that manufactured homes are less expensive per unit area than site-built and modular homes. The lower costs stem from assembly line production efficiencies, economies of scale and greater purchasing power of the manufactured home builders.

The report concludes with regulatory and technical recommendations that would help conventional homebuilders improve the efficiency of their operations by taking adapting the production processes of the manufactured homes sector to site-built construction and creating strategic alliances with manufactured home builders.

"Current Trends in Factory-Built Housing"; Welford Sanders, Urban Land, March 1997

The article reports that the factory-built housing industry is divided into two main categories, distinguished primarily by the building code that regulates their construction. One category is built to local or state building codes, including modular, panellized and log houses sectors. The other one is manufactured housing. It also summarizes recent trends for each category. [Check with Peter re nature of CSA that must be achieved and the relation to local building codes]

The article reports that a case study, done by the NAHB, found that the labour and material costs for the construction cost of identical 2,600 square feet houses were 16% lower when panelised framing technology was used vs conventional framing techniques.

"Opportunities to Improve Manufactured Housing Through the Use of Advanced Adhesives and Sealants"; Prepared by the Manufactured Housing Research Alliance for the U.S. Department of Housing and Urban Development, January 2003

This study examines opportunities in factory-produced housing industry to adopt adhesive-based automation and assembly line methods to significantly reduce labour demand and increase building performance and durability.

The study included surveys from 21 manufactured housing companies and 10 adhesive manufacturers.

The surveys found that interior wall construction and bottom board repair were application areas where adhesive-based automation and assembly line manufacturing could improve product quality, increase production efficiency, and produce a net cost saving compared to conventional methods. Savings were realised via reduced disposal and other environmental related costs, improved workplace environment and worker safety, and reduced property damage by natural hazards.

A Revised Approach to A Human Resource Development Action Plan For The Residential Construction Industry; Canadian Home Builders' Association, April 2007

This study built on a 2003 study commissioned by the CHBA and undated this earlier research in the wake of the 2007-08 budget that provided for fundamental changes to the education and training approaches for a new commitment to a new labour market training strategy and architecture. The study concluded that this new approach within the budget confirmed the role of provincial homebuilders' associations as the "primary advocate for training programs and other actions to increase the supply of skilled people in the residential construction industry." The four strategic objectives of the provincial associations are:

- *To support the development and delivery of training to occupations in the residential construction industry.*
- *To increase funding for residential construction industry training and to increase the industry's capacity to participate in planning and implementing training on an on-going basis.*
- *To support measures that will increase employee retention and improve job quality in the residential construction industry.*
- *To promote careers in the residential construction industry.*

The CHBA also notes that each province may have their own priorities with respect to implantation based on "different types of shortages, different levels of labour market training available, different levels of industry participation and other regional differences." (CHBA, 2007)

Summary of Provincial Association Responses about Issues and Priorities for Apprenticeship Reform, Canadian Home Builders' Association

The summary report reviewed the apprenticeship training systems in Canada and concluded the following:

- *It is imperative that provincial apprenticeship authorities recognize and designate specialty residential construction trades that currently are not recognized among the traditional construction trades.*
- *It is imperative that provincial apprenticeship authorities engage the residential construction industry in ways that will make apprenticeship programs more responsive to the specific needs of the industry.*
- *It is imperative that provincial apprenticeship authorities work with the industry to address barriers to the successful training of apprentices in residential construction trades.*

- *It is imperative that provincial apprenticeship authorities be more flexible in providing training. The most important modifications identified by Provincial Associations include the following:*
 - *changing the 1:1 journeyman to apprentice ratio;*
 - *laddered training and certification programs;*
 - *linking apprenticeship graduates with employers – developing an employer-based placement system to link new entrants, especially graduates from training institutions, with the industry's hiring processes; and,*
 - *improving career paths for people who want to pursue a career in residential construction.*
- *It is imperative that the residential construction industry have more direct involvement with the development of curricula, more modularization of training, and more flexibility in the delivery of training. The training system has to be properly resourced and the appropriate level of resources made available.*
- *It is imperative that all federal and provincial tax measures apply to all skilled trades used in residential construction, not just Red Seal trades. It is also important that provincial governments fund industry organizations, at least on a temporary or transitional basis, for the development of infrastructure required to indenture apprentices.*
- *Training system resources must be directed to essential skills upgrading that is incorporated into apprenticeship training.*

Source: Summary of Provincial Association Responses about Issues and Priorities for Apprenticeship Reform, Canadian Home Builders' Association

Pulse CHBA Pool: Atlantic Canada Home Builders Forecast Slight Moderation in Housing Starts and Stronger Renovation Activity. *The Pulse Survey was conducted by the CHBA with assistance from Canada Mortgage and Housing Corporation and Natural Resources Canada. The survey was tabulated and analyzed by Altus Clayton.*

The winter 2008 Pulse Survey looked at trends in Atlantic Canada and offered the following forecast (Winter 2008 Pulse Survey):

- *Atlantic Canada renovators reported increased activity. Almost half of renovators in Atlantic Canada reported that their renovation activity was higher over the past 12 months, while none reported lower activity.*
- *Moderation is expected in the number of housing starts (11,800 units in 2008, down slightly from the 12,391 units in 2007 – the average project reported by renovators in Atlantic Canada was \$55,000 and Canada-wide averages were in the vicinity of \$75,000.*
- *Homebuilders and renovators reported that they have higher employment levels (for both full-time and part-time workers) relative to last year.*
- *New homebuilders in Atlantic Canada reported that inventories of started but unsold single-detached units were similar to a year ago.*

- New homebuilders in Atlantic Canada are planning some modest shift in the upcoming year towards targeting the semi-custom segment of the move-up market, away from the first-time buyer segment.

In terms of challenges, the most often cited critical problems for new homebuilders in Atlantic Canada are trades/labour shortages and associated rising costs of trades/labour, rising serviced lot prices and rising development charges. Almost three-quarters of new homebuilders in Atlantic Canada expect new house prices to increase over the next year; none of the respondents expects a decline.

2.1. THEMES AND LESSONS DRAWN FROM THE LITERATURE REVIEW

The literature review provides the following main lessons.

- Manufactured housing, which is completely factory-built, costs 18% to 35% less than conventionally constructed housing.
- Factory built housing is less costly than comparable products built on-site because:
 - assembly line techniques help ensure that labour, machinery and tools are continuously employed;
 - energy costs per unit of output are reduced;
 - manufacturing is not affected by weather;
 - less time is spent relocating trades labour between sites;
 - technicians, craftsmen and assemblers can more easily be integrated into a work team;
 - less inventory is required and it can better controlled (e.g., materials can be better protected from theft and weather-related damage);
 - some materials are more easily worked in a climate controlled factory setting; and
 - greater computerisation of the production process reduces wastage and increases labour productivity.
- The cost of manufacturing housing could be further reduced and productivity increased by:
 - line balancing of assembly line station processes;
 - partial automation of the congested stations within the assembly line; and
 - lean production techniques.
- There are also productivity and cost advantages to using pre-engineered components in conventional on-site construction, e.g.:
 - interior wall construction and bottom board repair costs can be reduced and quality increased by the application of adhesive-based automation and assembly line manufacturing;

- roofing costs can be reduced by 30% to 40% by using roof panels;
and
- framing costs can be reduced by 16% when panelised framing technology replaces conventional framing techniques.

- There are opportunities for conventional residential homebuilders to increase their productivity by adapting the production processes of the manufactured homes sector to site-built construction and creating strategic alliances with manufactured home builders.

- The role of the manufactured housing sector in construction will increase due to growing labour shortages and new developments in materials and prefabricated assemblies.

3. INDUSTRY PROFILE

The production of manufactured housing stood at about 14,800 single-family and 2,090 multi-family residential units in 2004 (Canada wide using the NIACS 321992 definition of the sector)). About 11,860 of the single-family units were erected in Canada in 2004, about 7.2 per cent of all single-family housing starts.⁷ Domestic and export sales stood at about \$700 million and \$157 million respectively.⁸ Total production was reported by Building Excellence as \$1.2 billion in 2004, or about 1.5% of residential construction in Canada.^{9,10}

CMHC projects continued steady domestic demand for single section manufactured homes—those typically installed in one of Canada's roughly 1,000 land lease communities—due to the relatively lower cost of these units. Modular homes accounted for 40% of factory-built homes and these systems are growing in popularity.¹¹

Altus Clayton¹² (2006) found that improvements in quality and market development for pre-engineered home alternatives are attracting higher-end residential housing market segments. Growth in the higher-end market segments

⁷ "Factory-Built: Profile and Prospects, Key Trends Bode Well for the Factory-Built Housing Sector", Building Excellence, Fall 2005, p. 17.

⁸ "Profile and Prospects of the Factory-built Housing Industry in Canada", Canada Mortgage and Housing Corporation, July 2006, p. 2. (The profile included:

- manufactured homes;
- modular homes;
- pre-cut and pre-engineered homes;
- log and timber-frame homes;
- multi-unit residential modular homes; and
- wood-frame non-residential units; and
- output of the non-wood panelized housing sector.)

⁹ "Factory-Built: Profile and Prospects, Key Trends Bode Well for the factory-Built Housing Sector", Building Excellence, Fall 2005, p. 17.

¹⁰ Examination of the CMHC and Building Excellence reports did not explain the discrepancy between CMHC's sales data and Building Excellence's production data. One would expect some difference between sales and production depending on whether inventories were being reduced or increased. However, changes in inventory would not likely account for the \$343 million difference. For the purposes of this report we assume that the CMHC data are closer to correct because they coincide with Industry Canada data, which are referred to extensively in the rest of this report.

¹¹ Profile and Prospects of the Factory-built Housing Industry in Canada", Canada Mortgage and Housing Corporation, July 2006, p. 1.

¹² Profile and Prospect of the Factory-Built Housing Industry in Canada, CMHC and Altus Group, March 31, 2006

and quality improvements, combined with the high demand for housing, contributed to the 33% growth in modular home production between 1993 and 2006.

The manufactured housing industry is part of the Prefabricated Wood Building Manufacturing sector (NAICS 321992). NAICS 321992 comprises establishments primarily engaged in manufacturing buildings that are made away from the construction site, either in sections, complete units, or in components for on-site erection. These buildings include:

- manufactured and modular homes;
- prefabricated or pre-cut wood buildings, sections and panels;
- log cabins and log houses;
- timber-frame houses; and
- non-residential, pre-manufactured buildings.¹³

Table 1 provides an overview of the Canadian wood building establishments. Nova Scotia accounts for 12 of the 263 establishments. Of the 12, seven are owner-operated and the remaining five have paid employees. Of the seven that have employees four employ from one to four people and the remaining three employ from five to 99 people. Note that the sector definition in the tables below contains builders of non-residential products such as site trailers, garden sheds, etc. This is why Nova Scotia is shown as having 12 builders – **none of these establishments is a factory home builder.**

Table 1: Prefabricated Wood Building Manufacturing (NAICS 321992) Number of Establishments in Canada by Type and Region, December 2005				
Province or Territory	Employers	Non-Employers/Indeterminate	Total	% of Canada
Alberta	16	16	32	12.2%
British Columbia	49	21	70	26.6%
Manitoba	6	1	7	2.7%
New Brunswick	6	3	9	3.4%
Newfoundland and Labrador	1	0	1	0.4%
Newfoundland and Labrador	1	0	1	0.4%
Northwest Territories	0	0	0	0.0%
Nova Scotia	7	5	12	4.6%
Nunavut	0	0	0	0.0%
Ontario	31	21	52	19.8%
Prince Edward Island	0	0	0	0.0%
Quebec	58	20	78	29.7%
Saskatchewan	1	1	2	0.8%

¹³ Industry Canada,
http://strategis.ic.gc.ca/canadian_industry_statistics/cis.nsf/IDE/cis321992defe.html

Year	Establishments	Employment		
		Administrative	Production	Total
1993	86	624	1,934	2,558
1994	86	886	1,894	2,780
1995	88	710	2,358	3,068
1996	95	703	2,472	3,175
1997	94	914	2,722	3,636
1998	89	583	3,018	3,601
1999	78	690	2,858	3,548
2000**	164	624	3,031	3,655
2001	159	647	2,806	3,453
2002	174	942	3,086	4,028
2003	155	867	2,776	3,643
2004	NA	NA	NA	NA
2005***	175	NA	NA	NA
* Sales of manufactured products greater than or equal to \$30,000 and have paid employees				
** In 2000 head office data were no longer collected.				
***includes all establishments that have paid employees regardless of amount of sales of manufactured products.				
Industry Canada, Strategis: http://strategis.ic.gc.ca/canadian_industry_statistics/cis.nsf/IDE/cis321992date.html				

Yukon Territory	0	0	0	0.0%
CANADA	175	88	263	100%
Percent Distribution *	66.5%	33.5%	100%	
Source: Statistics Canada, Business Patterns Database, December 2005				

Table 2 provides an historical view of the number and change in principal establishments and total employment in the sector. Note the large increase in the number of establishments in 2000, which was not accompanied by a significant increase in total employment.

Exhibit 1 shows the change in the principal statistics from 1993 to 2003 (for all of Canada). All dollar values are shown in 2007\$ using the GDP price deflators provided in the most recent OECD economic outlook.¹⁴

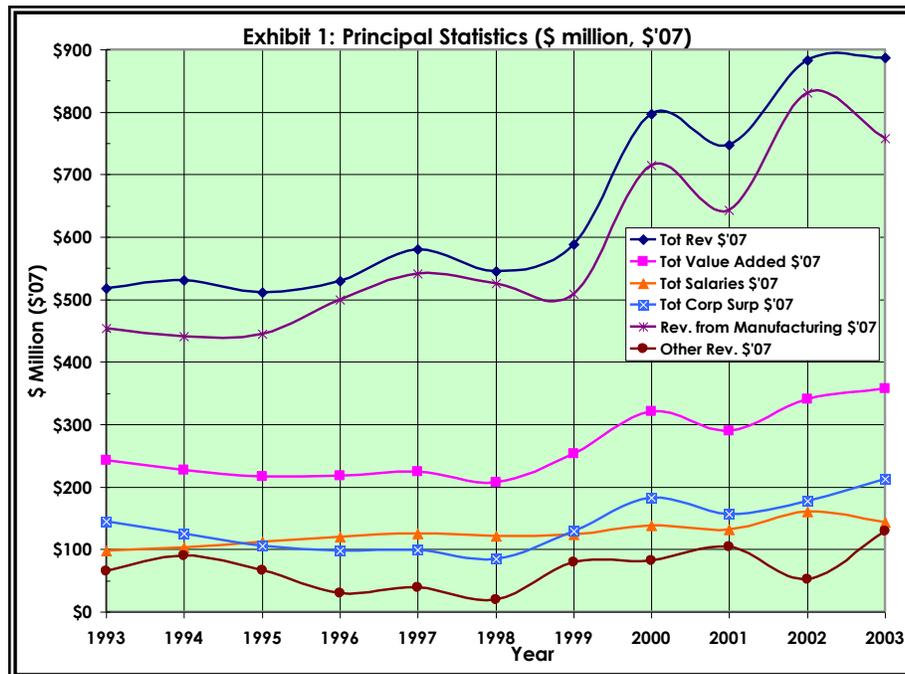
Total Value Added as a percent of Total Revenue stood at 46.8% in 1993. It has been on a general downward trend reaching 40.3% in 2003.

¹⁴ OECD Economic Outlook No. 81 - Statistical Annex Tables, <http://www.oecd.org/dataoecd/5/47/2483871.xls>

Corporate Surplus¹⁵ as a percent of Total Revenue declined significantly from its 1993 value of 28.0% to 15.6% in 1998 and recovered to 23.9% by 2003.

Total Wages and Salaries as a percent of Total Revenue showed an opposite trend to Corporate Surplus, rising during the mid-1990s from 18.8% in 1993 to 22.7% in 1996 and falling during the late-1990s and early 2000s to 16.2% in 2003.

These trends suggest that the sector increased its gross profit margin by, among other things, controlling wages, which (*see Exhibit 2 – Canada Wide*) rose from \$38,001 (\$'07) per employee in 1993 to \$39,396 (\$'07) in 2003, for an annual average real increase of 0.4%.



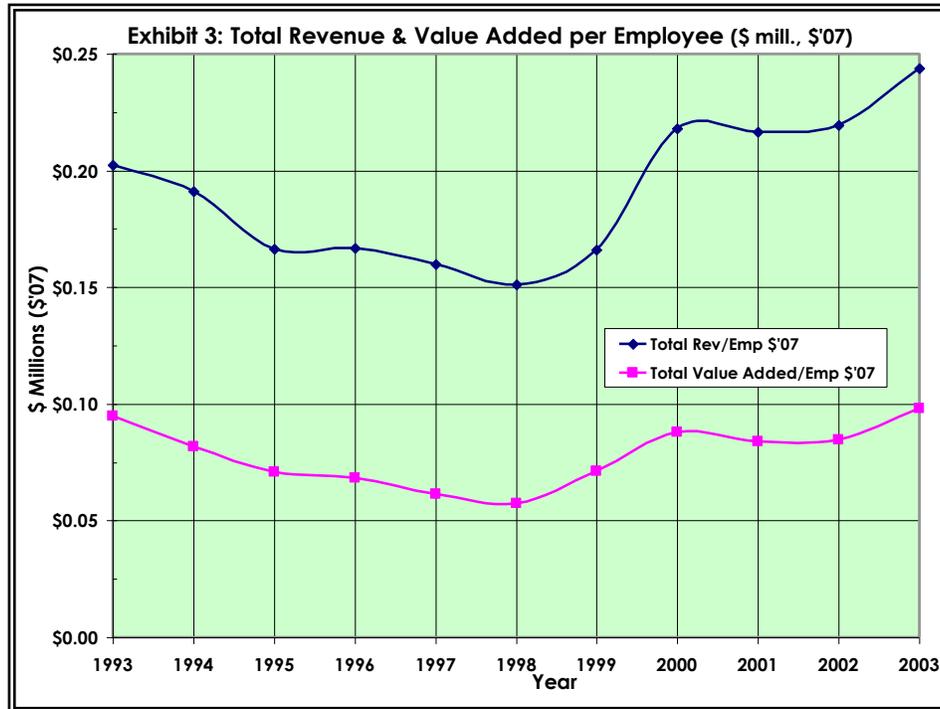
¹⁵ For the purposes of this report Corporate Surplus = Total Revenue – Wages and Salaries – Materials & Supplies – Fuel & Electricity



Exhibits 2 and 3 shows that, Canada-wide, the improved gross margin came from controlling wages, increased revenue/employee and increased value added/employee, which could have occurred for one or a combination of the following reasons:

- cost control with respect to input materials, services, fuel and electricity, and transportation and selling costs;
- improved prices (due to improved products and/or a tightening between supply and demand; and/or
- improved productivity in terms of physical output per hour worked.

Because of the combination of forces, total value added per employee returned to it 1993 levels by 2003.



3.1. EXPORTS

Table 3 shows ten years of export data. Nova Scotia produced exports have grown rapidly, 7.3% per year (real) from 1997 to 2006 (vs. 0.1% in the Rest of Canada). However, they remain a small percentage of Canadian exports, growing from 0.8% of Canada's total exports in 1997 to 1.5% in 2006.

CMHC reported exports of residential units in 2004 of \$169.6 million (\$'07), which is substantially less than the \$295.1 million (\$'07) reported in **Exhibit 3**. We are left to assume that the difference of \$125.5 million (\$'07) is made up of exports or non-residential buildings and other revenue from sales of goods not of their own manufacture.

Table 3: Exports (\$ million, \$'07), Prefabricated Wood Building Manufacturing (NAICS 321992)									
Year	Nova Scotia			Rest of Canada			All Canada		
	Top 10	Others	Total	Top 10	Others	Total	Top 10	Others	Total
1997	\$ 1.3	\$ 0.7	\$2.0	\$207.0	\$ 38.0	\$245.0	\$208.3	\$ 38.7	\$247.0
1998	\$ 1.4	\$ 1.0	\$2.4	\$201.9	\$ 32.6	\$234.5	\$203.3	\$ 33.6	\$236.9
1999	\$ 1.2	\$ 0.3	\$1.5	\$238.7	\$ 27.9	\$266.6	\$239.9	\$ 28.3	\$268.2
2000	\$ 1.6	\$ 0.7	\$2.2	\$267.5	\$ 20.2	\$287.7	\$269.0	\$ 20.9	\$289.9
2001	\$ 2.0	\$ 0.3	\$2.4	\$310.5	\$ 13.5	\$324.0	\$312.5	\$ 13.9	\$326.4
2002	\$ 2.0	\$ 0.5	\$2.5	\$323.1	\$ 25.0	\$348.1	\$325.1	\$ 25.5	\$350.6
2003	\$ 2.7	\$ 0.7	\$3.4	\$284.6	\$ 18.7	\$303.3	\$287.4	\$ 19.4	\$306.7
2004	\$ 3.5	\$ 0.3	\$3.8	\$264.8	\$ 26.5	\$291.3	\$268.3	\$ 26.8	\$295.1
2005	\$ 3.2	\$ 0.5	\$3.7	\$260.5	\$ 29.3	\$289.8	\$263.7	\$ 29.8	\$293.4
2006	\$ 3.6	\$ 0.1	\$3.7	\$232.6	\$ 15.0	\$247.6	\$236.3	\$ 15.0	\$251.3

Source: Industry Canada, Strategis, Trade Data on Line, http://strategis.ic.gc.ca/sc_mr
 Source: OECD Economic Outlook No. 81 - Statistical Annex Tables, <http://www.oecd.org>
 Source: Jozsa Economics & Management

3.2. IMPORTS

Table 4 provides an overview of 10 years of import data. A comparison of **Tables 3 and 4** shows that Nova Scotia and the Rest of Canada run a large, in percentage terms, trade surplus in the products of the Prefabricated Wood Building Manufacturing sector.¹⁶

Table 4: Imports (\$ million, \$'07), Prefabricated Wood Building Manufacturing									
Year	Nova Scotia			Rest of Canada			All Canada		
	Top 10	Others	Total	Top 10	Others	Total	Top 10	Others	Total
1997	\$ -	\$ -	\$-	\$ 2.1	\$ 0.1	\$ 2.2	\$ 2.1	\$ 0.1	\$ 2.2
1998	\$ 0.0	\$ -	\$0.0	\$ 1.2	\$ 0.0	\$ 1.2	\$ 1.2	\$ 0.0	\$ 1.2
1999	\$ 0.0	\$ -	\$0.0	\$ 1.7	\$ 0.0	\$ 1.7	\$ 1.7	\$ 0.0	\$ 1.7
2000	\$ -	\$ -	\$-	\$ 2.2	\$ 0.2	\$ 2.3	\$ 2.2	\$ 0.2	\$ 2.3
2001	\$ 0.0	\$ -	\$0.0	\$ 2.3	\$ 0.1	\$ 2.4	\$ 2.3	\$ 0.1	\$ 2.4
2002	\$ -	\$ -	\$-	\$ 2.3	\$ 0.1	\$ 2.4	\$ 2.3	\$ 0.1	\$ 2.4
2003	\$ 0.0	\$ -	\$0.0	\$ 3.2	\$ 0.0	\$ 3.2	\$ 3.2	\$ 0.0	\$ 3.3
2004	\$ -	\$ -	\$-	\$ 4.9	\$ 0.3	\$ 5.2	\$ 4.9	\$ 0.3	\$ 5.2
2005	\$ -	\$ -	\$-	\$ 6.1	\$ 0.1	\$ 6.2	\$ 6.1	\$ 0.1	\$ 6.2
2006	\$ 0.1	\$ -	\$0.1	\$12.6	\$ 0.0	\$12.6	\$12.7	\$ 0.0	\$12.7

Source: Industry Canada, Strategis, Trade Data on Line, http://strategis.ic.gc.ca/sc_mr
 Source: OECD Economic Outlook No. 81 - Statistical Annex Tables, <http://www.oecd.org>
 Source: Jozsa Economics & Management

¹⁶ The trade surplus in prefab building manufacturing may see at odds with Nova Scotia's lack of a modular home manufacturer. As noted earlier, Statistics Canada's definition of 'prefabricated wood building products is more encompassing than our look at factory build residential homes.

4. MANUFACTURED HOME PRODUCTION IN THE MARITIMES

From our research, we conclude that factory built modular residential homes are not produced in Nova Scotia. However, there are firms in the Maritimes that supply retailers in Nova Scotia. Also, Nova Scotia is home to producers of log homes, pre-cut and pre-engineered homes and residential construction components (e.g., trusses and panels) These are discussed in **Section 4.2** Other Forms of Manufactured Homes and Housing Components.

4.1. REGIONAL SUPPLIERS

The major manufacturers of factory built homes in the Maritimes are located (for the most part) in New Brunswick. Manufactured and modular home manufacturers in New Brunswick include:

- Prestige Homes;
- Maple Leaf Homes;
- Kent Homes;
- Supreme Homes; and
- Hospitality Homes.

4.2. PRODUCTION AND ASSEMBLY OF MANUFACTURED HOMES¹⁷

Modular homes are computer engineered to meet local building standards. Controlled environments are used by most production facilities in combination with quality materials and precision engineering - a product of high quality and durability can be consistently produced.

In most forms, the completed factory built home (or section) is weather tight and fully insulated, with finished walls and exteriors; windows, bath fixtures, carpets kitchen cabinets, heating installed and all electrical and plumbing requirements are installed. The photos below show a modular home in various stages of completion.



(Photos from www.modularcenter.com)

¹⁷ Information for this section was drawn from www.modularcenter.com.

4.2.1. TECHNOLOGY

Altus Clayton's March 2006 report presented the sector outlook regarding future possibilities for technology and production methods and integration between the factory-built and on-site built sectors. They also found that the factory-built housing sector is relatively “low-tech” relative to European operations/highly mechanized plants. There are also issues around capacity utilization in Canada that bias against capital, for example, most plants are not run around the clock (like in auto sector) and most have slow or off seasons.¹⁸

Factory homebuilders rely primarily on division of labour, bulk purchases of factor inputs and efficient production flow to lessen production costs. However, the processes involved are still viewed as labour-intensive, in relation to available options for mechanization (Some examples of equipment are provided in **Appendix D**). Although large-scale, labour-saving technology does exist for factory building of houses, Canadian manufactures lag behind in the introduction of this equipment. A main barrier to the adoption of technology within plants is that equipment is expensive for most small businesses to consider employing. However, the consistent rise in the value of the Canadian-dollar effective exchange rate index (CERI)¹⁹ (see **Figure 1**) since the fourth quarter of 2002 should put manufacturers in a better position to purchase imported machinery and equipment manufactured in the US.

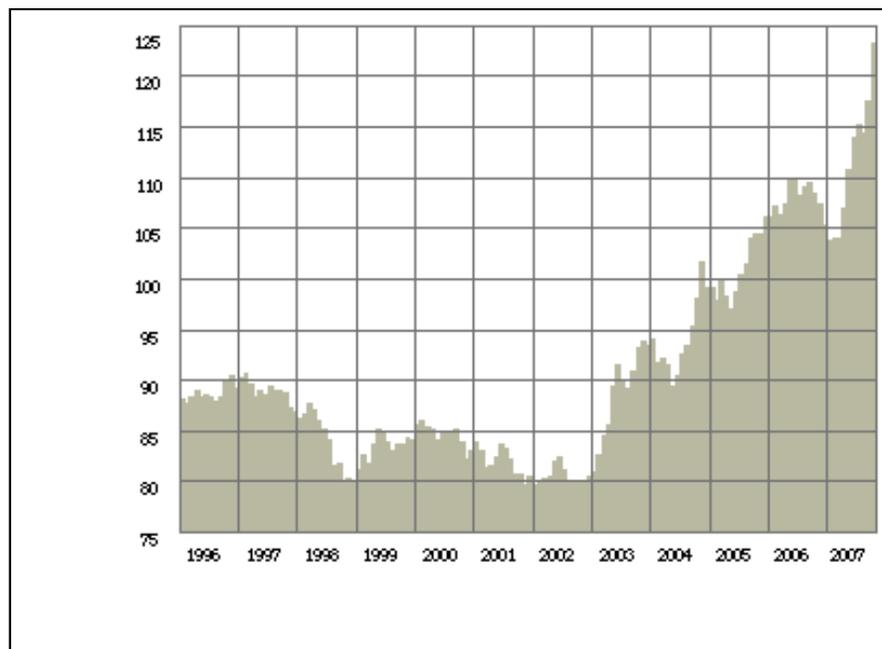


Figure 1 - Canadian-dollar Effective Exchange Rate Index 1996 – October 2007 (1992 = 100)

Source: Bank of Canada, <http://www.bank-banque-canada.ca/en/graphs/a1-table.html>

¹⁸ Altus Clayton's March 2006

¹⁹ Canadian-dollar effective exchange rate index (CERI) is a weighted average of bilateral exchange rates for the Canadian dollar against the currencies of Canada's major trading partners.

Figure 1 also makes it evident that the rising value of the Canadian dollar is not a new phenomenon and has been on a consistent upward trend (0.55%/year) since the fourth quarter of 2002. This figure suggests that Canadian industry has had 21 quarters to adjust.

Interview comments suggest that the rural locations of manufactured home builders tend to insulate them for labour shortages and higher wage rates. If this is the case, the situation may reduce the incentive to invest in machinery and equipment. Conversely, 'one-industry-town' phenomenon is likely under pressure due to youth out-migration.

4.2.2. LABOUR WITHIN MANUFACTURED HOUSING

Manufactured housing factories in Canada report their highest need is for general labourers, comprising over 90% of the total factory staff. The remaining amount is made up of apprentices and licensed professionals. More than 90% of production staff fall into the following categories (Altus Clayton):

- Exterior Finishing
- Electrical
- Insulation
- Framing
- Plumbing
- Maintenance
- Interior Finishing
- Metal Work
- Supervision

The remaining 9% to 10% of production workers are involved in:

- shipping and transportation; and
- operating specialized handling equipment.

Data describing the breakdown of production labour skills were not available for Maritimes based firms. We assume that the profile is similar to that of the Canadian industry.

4.2.3. TRANSPORTATION

Businesses involved in this sector, including log, timber, panel and modular, are competitive with traditional onsite construction within a 500 km radius. Panel, timber, kit and log home producers also enjoy significant export market. In the case of one NS based producer, 90% of their market is offshore. In contrast, modular home producers apparently tend not to ship past 500km because of transportation costs. Exportation of modular homes would be prohibitively expensive relative to, for example, kit homes where the kit for an entire home

could be containerized or palletized (depending on the transportation method). Modular homes would take considerably more volume (relative to weight).

4.2.4. MARKETS

The manufactured housing sector has its major markets outside urban centres for the following reasons:

- On-site builders can be more efficient and profitable in urban areas due to the greater density of the market. They can control costs and raise productivity by undertaking concurrent home building assignments.
- Because urban on-site builders can increase their efficiency by maintaining several job sites the relative time-to-delivery advantages associated with manufactured homes is reduced or eliminated.
- A larger part of the urban market is directed to 'executive style' homes. Manufactured homes do not have a competitive advantage in this market relative to on-site builders, presumably because of the high level of custom work that is required.

Our interviews indicated that manufactured homes are in more demand in rural settings and that this is driven by a shorter delivery time (relative to on-site) and/or cost. Wait times for new construction in rural areas can be long due to the limitations on the availability of rural on-site construction crews. This situation makes manufactured homes an attractive option to rural customers seeking new home construction.

Where manufactured homes are anticipated to make inroads in NS is in the area of multiple unit townhouse dwellings. These units lend themselves well to manufacturing methods where townhouse modules can be replicated in a factory setting and assembled on-site. This may represent the best option for a significant number of manufactured units to be made available in HRM.²⁰

²⁰ In January of 2004 HRM imposed a three month moratorium on new large-scale housing developments in most un-serviced areas of HRM. If similar policies are adopted in the future, these would have a dampening affect on the potential of manufactured housing. (<http://www.halifax.ca/mediaroom/pressrelease/pr2004/040122regplanmorator.html>) Offsetting the potential)

4.3. OTHER FORMS OF MANUFACTURED HOMES AND HOUSE COMPONENTS

The scope of this study was expanded to include producers of kit homes, log homes, timber frame homes and major house building components such as wall panels and trusses.

4.3.1. KIT HOMES

Interhabs is Nova Scotia's only producer of "kit homes". The firm was established in 1975. Industry Canada reports that it has total sales in the \$1.0 million to \$5.0 million category and has about 30 employees. It produces prefabricated homes for the domestic market and export markets in the United Kingdom, Europe, United States, South America, Iceland and South Korea. Their production facility is located in Hubbards, Nova Scotia. Products are shipped via container.

Kit home producers are able to ship beyond the 500 km limits (approx.) of manufactured and modular homes and remain price competitive. These products are shipped in kit form and because container-shipping prices are based on volume, not weight, they gain transportation efficiencies relative to manufactured and modular homes. Accordingly, log home producers in Nova Scotia tend to have large export markets.

4.3.2. LOG HOME PRODUCERS IN NOVA SCOTIA

These products are manufactured in Nova Scotia by:

- Dow and Duggan Log Homes International Limited;
- Fall River Log Homes;
- Great Ocean Custom Log Homes Inc.;
- Heartwood Log Homes Ltd.;
- Kenomee Log Homes Ltd.;
- Stockade Style Log Homes; and
- Timberstone Log Homes Ltd.

These firms produce pre-engineered components of log homes and pre-cut log home kits that are assembled on-site.

4.3.2.1. LOG HOME MANUFACTURING AND ASSEMBLY

Many of today's log homes are built from pre-milled or handcrafted logs and assembled on-site. Milled logs are also called machine-profiled, and created with a log house moulder. The manufacturing process removes natural features and imperfections and produces milled logs that are consistent in size and appearance. Milled logs require less labour to assemble than hand-crafted logs.

Handcrafted logs are generally peeled but are otherwise unchanged from their natural appearance when they were trees.



(Photos from www.heritagelog.com)

4.3.2.2. LABOUR NEEDS OF LOG HOME MANUFACTURERS

Labour skill requirements, from planning to assembly, include:

- drafting;
- mill working;
- quality control;
- processing machine operators;
- forklift and crane operators;
- packaging and shipping; and at the assembly site (the same skill profile found in on-site residential construction work, but presumably with less time on site).

Based on interview results, wage rates are the \$10 - \$12/hour range.

4.3.2.3. TRANSPORTATION AND MARKET REACH OF LOG HOME MANUFACTURERS

Log home producers are able to ship beyond the 500 km limits (approx.) of manufactured and modular homes and remain price competitive. These products are shipped in kit form and because container-shipping prices are based on volume, not weight, they gain transportation efficiencies relative to manufactured and modular homes. Accordingly, log home producers in Nova Scotia tend to have relatively large export markets.

4.3.3. TIMBER FRAME HOME PRODUCERS IN NOVA SCOTIA

Timber-frame homes are produced in Nova Scotia by a variety of firms including:

- Legacy Timber Frames Limited; and
- Timberhart Woodworks (formerly Acorn Timber Frames).

Information on the employment profiles and sales of these firms are not available. Contact points for these firms are listed in **Appendix B**.

4.3.3.1. TIMBER FRAME HOME MANUFACTURING AND ASSEMBLY

Timber frame homes are characterised by their exposed post and beam framework, as shown in the photos, below.



(Photos from www.whistlertimberframe.com)

The assembly of timber frame homes is more labour intensive than the construction of standard residences. Materials must be carefully cut and milled. Wastage tends to be higher than manufacturing of log homes. The labour intensity combined with the generally higher cost of materials puts timber frame homes in the upper half of the housing price range.

4.3.3.2. LABOUR NEEDS OF TIMBER FRAME HOME MANUFACTURERS

The manufacturing and assembly of timber frame homes requires a labour skills profile that is very similar to that for the manufacturing and assembly of log homes. Wage rates are generally in the \$10 to \$15 per hour range, with a minority of employees earning about \$20/hour.

4.3.3.3. TRANSPORTATION AND MARKET REACH OF LOG HOME MANUFACTURERS

Timber frame home producers are able to ship beyond the 500 km limits (approx.) of manufactured and modular homes and remain price competitive. These products are shipped in containers and because container-shipping prices are based on volume, not weight, they gain transportation efficiencies relative to manufactured and modular homes. Accordingly, timber frame home producers in Nova Scotia tend to have relatively large export markets.

4.3.4. WALL PANEL AND BUILDING COMPONENT PRODUCERS IN NOVA SCOTIA

The following firms manufacture wall panels, trusses, joists and other building components in Nova Scotia:

- Halliday Flooring;
- J. A. G. Trusses & Prefabricated Walls; and
- MacPherson Bros. Bldg. Supplies Ltd.

Information on the employment profiles and sales of these firms are not available. Contact points for these firms are listed in **Appendix B**.

4.3.4.1. ASSEMBLY

The use of pre-built components saves time and money relative to their construction and installation on-site.

Factory built components bring similar cost and quality benefits to those of manufactured housing. The assembly line process, reduced material handling and controlled environment combine to produce efficiency gains and components that can be of higher quality than those constructed on-site. The following photos show the on-site installation of wall panels.



(Photos from www.wintonglobal.com)

The use of prefabricated components offers traditional on-site residential builders opportunities for increased efficiency, lower cost and higher profits.

4.3.4.2. LABOUR NEEDS

The labour skills required to produce prefabricated components are primarily provided by carpenters and general labourers. Producers of prefabricated building components in Nova Scotia tend to purchase transportation services rather than investing in transportation equipment and labour.

4.3.4.3. TRANSPORTATION AND MARKET REACH

Panel producers are able to ship beyond the 500 km limits (approx.) of manufactured and modular homes and remain price competitive. These products are shipped in efficiently packaged containers or are palletized. Accordingly, panel producers tend to have relatively large export markets.

5. PROFILE OF WORKERS

The scope of research was broadened beyond the narrow definition of manufactured housing to include forms of prefabricated home and home-building components. Similarly, the scope of occupations and skill levels discussed in this section is broader than originally intended.

This section provides an overview of the occupations and skill levels needed to manufacture homes, home kits and home-building components. Within the overview, we describe some of the differences between the labour needs of the range of home and home-building component producers.

5.1. OCCUPATIONS

5.1.1. MANUFACTURED HOUSING²¹

Across Canada, about 60% of the production labour force is unionised.

General labour makes up of over 90% of production workforce.

The remaining 10% is composed of licensed trades-workers, other licensed occupations, apprentices and technicians/technologists such as:

- carpenters
- drafters
- designers
- drafting technologists
- electricians
- milling machine operators
- millwrights
- fork lift operators
- crane operators

Union shops report that more than 90% of their production staff is involved in the following activities:

- exterior finishing
- electrical installation
- insulating
- framing
- plumbing
- maintenance
- interior finishing
- metal work
- supervision

²¹ Figures presented here are derived from a PowerPoint on Factory-Built Housing Workforce Study for the Construction Sector Council by Altus Clayton, April 2007

The remaining production workers are involved in:

- shipping and transportation; and
- operating specialized handling equipment.

5.1.2. LOG HOME AND TIMBER FRAME PRODUCTION

Log home producers report labour needs at their manufacturing sites that are similar to those for the Canadian manufactured housing producers. The skills required include:

- drafters
- mill workers
- quality control staff
- processing machine operators
- forklift and crane operators
- packagers and shippers

Labour skill needs at the log and timber-frame home assembly site are the same as those found at on-site residential construction sites. Based on interview results, wage rates are generally in the \$10 to \$15 per hour range, with a minority of employees earning about \$20/hour.

However, in contrast to the labour required to install manufactured homes at the homeowner's property, the labour skill needs at the log and timber-frame home assembly site are the same as those found at site-built residential construction sites.

5.1.3. KIT HOME PRODUCTION

The labour skills required for the production of kit homes is similar to that for log home production, however, there is a much reduced reliance on skilled labour.²²

5.1.4. HOME-BUILDING COMPONENT PRODUCTION

The labour skills required to produce prefabricated components are primarily provided by carpenters and general labourers. Producers of prefabricated building components in Nova Scotia tend to purchase transportation services rather than investing in transportation equipment and labour.

The breadth of occupations involved in the production of home-building components is reflected in a recent employment posting by a wall panel producer in Nova Scotia (Source: careersinwood.ca). The employer was looking for people with capabilities in:

- rough, general and finish carpentry;

²² "Concept Home Principles -Improved Production Processes: Research Summary" U. S. Department of Housing and Urban Development's Office of Policy Development and Research, June 2005, p. 8.

- framing;
- hardwood floor installation,
- form work;
- aluminum, steel, vinyl and wood exterior siding installation;
- specialty millwork; and
- panel systems installation.

The employer advised that it would be advantageous if applicants were in their 1st Period Apprentice and had certificates in Occupational Health and Safety Certificate, First Aid Certificate and or WHMIS.

5.2. UNIQUE CHARACTERISTICS OF OCCUPATIONS

5.2.1. GENERAL LABOURERS

General Labourers may or may not have had job-specific training before being hired. Most of these workers need on-the-job training once employed, and the time required to do so depends upon the skills or duties assigned to the individual. Businesses would prefer to have community colleges provide more of this type of learning experience, so as to lessen the cost that businesses incur during this time. Apprentices may fall into this category, especially if the education received did not provide the hands-on opportunities required by the employer. General labourers may start out with maintenance responsibilities, such as sweeping the floors, but eventually develop the skills required to handle different tools or machinery at the work place. The time it takes for this progression depends on the individual, and businesses would rather not have to factor it in as part of their expense. There is a dilemma here. It is not likely the NSCC would train people if they are going to be paid and regarded as general labour. ***It is likely not worth it for students and not worth it for a community collage system to create programs tailored for general work and, in fact, on-the-job training would be more relevant. In these cases, programs that support customized training for factory workers would be more appropriate to the training needs of the sector.*** |

5.2.2. CARPENTERS

Carpenters involved in Manufactured Housing production have relatively the same skills as those performing on-site residential construction, however, the duties may vary based on what may be required of them in the factory setting. Processes involved in the production of timber frames or logs differ from those of on-site construction, for example.

5.2.3. DESIGN/DRAFTING

Manufacturing houses requires considerable time at the drafting table. The design team needs to be able to consider the materials with which the company works, as well as the needs of the customer, and then marry the two

together. The drafting technologists have the ability to generate computer images of the desired product, allowing a 3D representation for manipulation and visualization. This type of skill is required for on-site residential construction, but is not present at the site. It is, however, an everyday part of the Manufactured Housing workplace. At this point in time, businesses find it difficult to hire persons trained for this occupation, as the trend has been for graduates of such training programs to head west. It is not clear that this gap results from a shortage of these types of workers or an unwillingness/inability to pay wages that would be competitive with career paths in other labour markets and other regions of Canada. It does, however, indicate a need to increase training capacity and or recruitment of drafting technologists.

5.2.4. MILL WORKERS

Mill workers are very similar to general labourers. They may or may not have had previous experience with the tools of the trade and quite often receive training with specific milling equipment once hired.

5.2.5. MILLWRIGHTS

Millwrights are expected to be more mechanically inclined, with the ability to maintain and calibrate the machines required by these production facilities. Depending on the specifications for a log or timber, adjustments are often required of the machines to produce the desired result. It is up to these individual to properly interpret plans and then ensure the machines are set accordingly. Although training does exist in the province, people with this expertise are almost impossible to find for hire. The training needs may be too manufacturer- specific for the community collage system or trades schools to address. In these cases the recommendation is to contact the original equipment manufacture (OEMs) and ask them to put on training. Alternatively, or employers could send the millwrights on training trips to the OEMs location.

5.2.6. EQUIPMENT OPERATORS

Forklift and crane operators, as well as employees involved in the transportation of the manufactured components, have similar skill sets and duties as those of workers on other job sites in the province.

Training and certification is desirable for all the above trades, but in most cases the employer realizes it cannot be mandatory, given the shortage of available labourers on the market.

During interviews with representatives of the industry it was determined that wages for most of these workers depends on the amount of experience and skill each brings to the job. In general, skilled labourers are hard to find, and employers would like to pay only \$8/hour for unskilled employees. However, the trend is that labourers are not interested in working for less than \$10/hour, so that

is the general starting wage. It may increase to \$12 or \$15 once the employee has obtained new skills. Higher trained employees, like drafts- people and millwrights are paid more if they are able to handle the duties required, but \$20/hour is generally the ceiling placed on such occupations. These wages are in line with similar occupations within the province, as indicated in the tables below.

To provide a clearer understanding of what is required of someone working in this industry, the following describes the duties and training expectations for a business producing wall panels in Nova Scotia, as posted in a job ad:

General carpentry, Rough carpentry, Finish carpentry, Framing, Hardwood flooring, Form work, Exterior siding, wood, Exterior siding, vinyl, Exterior siding, aluminum, Exterior siding, steel, Specialty millwork/panel systems installation.

1st Period Apprentice, Occupational Health and Safety Certificate, First Aid Certificate, WHMIS Certificate

In contrast to interview findings that reflect a labour shortage, the annual Labour Force Survey data shows that construction industry unemployment was 14% in Nova Scotia in 2007, up from 13.3% in 2006, substantially more than the overall rate for Nova Scotia of 5.9% in September 2007.

5.3. WAGE RATES

Our interviews found that although employers in Nova Scotia would prefer to pay \$8 to \$10 per hour for general labour they need to pay \$10/hour or more to attract general labour. Their view is that the combination of the long history of out migration, the baby-boom generation aging out of the labour force and the improving economy has resulted in a tighter labour market than many employers in Nova Scotia have grown used to. General labour rates now begin at about \$10/hour rise to about \$12 to \$15/hour as on-the-job experience is gained.

Occupations requiring more training, such as designers, drafters and the ticketed trades are paid rates up to about \$20/hour. Repetition

As **Table 1** shows minimum hourly wages paid by Nova Scotia producers of log and kit homes and pre-built housing components are at or just below the province wide minimums for similar occupations.

Maximum hourly wages paid are well below the top rates paid in Nova Scotia.

Therefore, we expect that average wage rates are below Nova Scotia averages.

Table 1: Hourly Wages for Selected Construction Related Occupations in Nova Scotia (October 2007)

Occupation:	Low	Average (approx.)	High
Construction Managers	\$12.50	\$25.00	\$43.20
Contractors & Supervisors, Other Construction Trades, Installers, Repairers & Servicers	\$10.50	\$18.00	\$25.60
Construction Millwrights and Industrial Mechanics	\$11.16	\$21.50	\$29.86
Construction Trades Helpers and Labourers	\$8.00	\$12.50	\$27.30
Crane Operators	\$11.50	\$21.35	\$33.65
Heavy Equipment Operators (Except Crane)	\$10.42	\$15.75	\$28.00
Truck Drivers	\$8.50	\$15.40	\$24.00

Appendix C provides more detail on wage rates for these occupations in Nova Scotia.

6. RECRUITMENT AND RETENTION

Across the province and throughout other jurisdictions, virtually all industries report facing an aging work force and challenges in attracting new entrants. Recruiting newer and/or younger employees into residential construction has become a problem for a variety of reasons. Our research suggests that the primary reasons are the decrease in the number of available qualified people and the perception that there is a lack of job security, relatively low wages, and limited earning growth potential.

In Nova Scotia we are seeing two trends – one where young people are avoiding entering/choosing the trades as a career and the other is the exodus of youth to western regions. In these cases young (and older workers) are attracted by employment prospects that, in many cases, pay considerably more than the equivalent locally based occupation. For young people, there is the added attraction that they can start a job with little or no experience and little or no skills or training and easily make more than (in some cases twice) what is offered locally.

An October Statistics Canada release stated the unemployment rate dipped 0.1 percentage points to 5.9% in September 2007. This was the first time since November 1974 that the rate has been below 6.0%. Over the first nine months of 2007, manufacturing employment declined by 3.7%, but there was robust growth in construction. The growth in construction indicates the opportunity for individuals to work in the construction industry and draws our awareness to the shrinking of labour pool from which to hire construction workers.

Businesses interviewed during this study were consistent in identifying recruitment as an issue, but in some cases offered differing approaches to worker retention. We heard that older employees were less likely to leave the workplace to pursue employment opportunities in Western Canada. However, some may decide to open up their own businesses because of the knowledge and experience they have gained through on-the-job training (i.e., some employees leave the work site to start up businesses of their own, such as log home building). Several employers indicated to us that, if they can find a strategy to meet a particular worker's needs, that worker would be more likely to remain at the same job for an extended period. We did not learn of any specific steps that employer take to retain their workforce outside of what one would normally expect – some of which is required by collective agreement and or regulation (e.g., benefits, safe working conditions, etc.)

Migration of residential construction workers does occur, but not necessarily from one construction site to the next. Workers who have been involved in more assembly line type work are more likely to migrate their skills to another assembly job opportunity, regardless of whether or not it pertains to residential construction. Carpenters, it appears, are likely to continue working in

construction and operators of forklifts or cranes and can obviously transfer their skills to a wide variety of locations where such skills are required.

The *Youth Decision Report 2004* examined what students are choosing for career paths and why. By surveying schools throughout the province it became clear that a lack of awareness exists regarding apprenticeships and skilled trades. These results suggest that more work needs to be done to educate, not only Nova Scotia's youth, but also their parents, teachers and guidance counsellors about career options in the skilled trades.

During our own research we met with grade 10, 11 and 12 students to explore some of the decision making that takes place as these young people contemplate their next decisions with respect to their education. Students put emphasis on jobs that guaranteed high income, as well as jobs that offered enjoyment. For them, trades did not seem to fit into either of these categories. As to why they were not choosing trades; there was little awareness that many people in the trades, including construction, do enjoy their work and would recommend it. This serves as another argument in support of a more effort from the sector to raise awareness.

6.1. CAREER CHOICES, EDUCATION AND TRAINING

In the *Youth Decision Report 2004*, Students expressed a belief that skilled trades may offer job opportunities but they were unaware of the training required. Students were not considering a career in residential construction trades or trades in general. We attribute this finding, in part, to the fact that youth are not being encouraged by family, friends or educators to consider trades as options – furthermore, few have the opportunity for any exposure to the trades. The fact that residential construction trades are not viewed by young people as interesting, challenging or well paid continues to exacerbate the developing imbalance in the supply and demand for skilled trades.

It would appear that today's students are turning away from the traditional trades, seeing higher education as the preferred path. Indeed, this seems to have been the trend for the past several years. There is increasing pressure from family, the media, etc. to choose higher education as the 'only' next step to career success.

It is common for students to undertake a university education and soon afterwards and some realize the choice was not best suited for their likes, learning styles and skills. Some need to take this path if only to discover it is not right for the them. It becomes increasingly important to provide these students with the educational materials and opportunities for exposure to skilled trades at school, given less than half of the students surveyed for the *Youth Decision Report 2004* had said they had seen information there. This group most often turns to the Internet for information regarding post-secondary careers, which highlights the importance of promoting skilled trades through that means. This

illustrates the cultural and societal hurdle that must be overcome to improve awareness of residential construction as a career path.

If students, and those who influence them, were more aware of the increasing level of technology involved and the training paths available in the skilled trades they might see the trades as a more viable career option. With that would come a genuine understanding of the corresponding standard of living, the entrepreneurial opportunities and advancement possibilities. Taking such aspects into consideration, students might then do a better job of choosing careers that best suit their personal interests and skills.

A challenge to everyone is uncovering individual interests in skills. To do so, it is of great importance to have exposure to the many possibilities that exist. This largely becomes the role of schools, and we are seeing the increased need to ensure students enrich their experiences as early as possible. There are individuals, for example, who do not have confidence in their mechanical skills. They may have aptitudes in these areas but have lack the opportunities to expose themselves to these outlets. Youth need to have early exposure to trades training opportunities.

There may also be untapped youth amongst the aboriginal and minority ethnic communities that could be drawn into the field if they were encouraged to work in pairs or teams of their peers. Employers are encouraged to contact band councils and community youth programs in their region to help recruit candidates. For youth-at-risk in economically disadvantaged areas there may be government subsidies available.

Recommendation 1: Develop interactive web resources that appeal to youth. This should include video clips of work in the field and interviews with employers and employees who enjoy their work.

Recommendation 2: To recruit amongst the growing number of aboriginal and minority youth who are graduating from high school, contact band councils and community youth programs to schedule recruiting presentations at local schools and community centres. Other non-traditional or under represented labour sources include females.

6.2. RETENTION

During our interviews with Nova Scotia employers, we were told that older employees were less likely to leave the province to pursue employment opportunities. However, businesses do report a growing trend of older employees who start their own businesses. We expect that this trend is being propelled by three main forces:

- The improvement in the Nova Scotia economy;
- A realisation by older workers that in the improving economy their experience will be highly valued; and

- The reduced risk of leaving an employer that stems from;
 - the older worker's experience,
 - out-migration of younger members of the labour force, and
 - overall improvement in the Nova Scotia economy.

While this trend may be an enticement into trades for some, it is not something that employers control.

Aside from raising wages, another retention strategy for employers more under their control is to provide access to professional development opportunities. Employers need to be supportive of the workers by investing in their training and professional development. The Sector Council has long been active in this regard and we see a need to continue in this role.

Recommendation 3: Explore sources of funding support from government, develop the business case for company-funded professional development in specific occupations, and develop an industry-coordinated professional development program beyond the provincial apprenticeship programs.

6.3. INTER-INDUSTRY LABOUR MIGRATION

Construction workers in the site-built residential construction sector tend not to move into the employ of the factory-built home sector. We expect that the main reason for the lack of movement into the factory-built sector is that wages in the site-built residential construction sector tend to be higher. The wages tend to be higher because the demand is perceived as greater in the site-built sector.

7. HUMAN RESOURCE PLANNING AND DEVELOPMENT ISSUES & POTENTIAL SOLUTIONS

Currently in Nova Scotia 3,000 to 4,000 new trades people are needed to meet current demand (Source: workitns.ca). It is projected that by 2020, 40% of new jobs will be in skilled trades and technologies and Canada will be facing a skilled labour shortage of nearly one million workers (workitns.ca).

Carlton University professor Linda Duxbury says that the annual growth of the labour force is declining at such a rate that within the next decade that for two people retiring there will be less than one person to take their place.²³

In a media release, October 4, 2007, NSCC stated its enrolment has reached an all-time high. Its 2006 survey found that 93% of NSCC graduates live and work in Nova Scotia, and 83% of them are working in their field of study. The NSCC is working with its existing resources to prepare students in trades and technology, including in the construction trades. However, some employers interviewed maintain it is falling short of industry requirements.

More specifically, we have identified 12 companies in Atlantic Canada in the manufacturing subsector of residential construction. While there are unique demands in the subsector for draftsmen designers and mobile crane operators, it does not appear there is enough demand for training specifically *related to the factory-built segment of the construction sector* to warrant increasing local delivery of course/workshop offerings through the Manufactured Housing Consultant (MHC) Program.

Recommendation 4: With respect to draftsmen designers, local employers should work closely with the NSCC Co-operative Education Program. The two-year Drafting-Architectural program seeks employers to match with students between the first and second year of the program. (The program seeks paid employment for its candidates and the innovative nature of the factory-built construction subsector could be attractive to students seeking a specialized niche.)

Mobile crane operators are a designated trade in Nova Scotia, but no apprentice program in this trade is currently offered in Nova Scotia.²⁴

Recommendation 5: Local employers in Atlantic Canada are advised to support apprenticeships for mobile crane operators through the New Brunswick Department of Post-Secondary Education, Training and Labour Apprenticeship and Certification Branch.

²³ In an article by Katherine MacKlem titled, "Showing the love", MacLean's Magazine, October 2005

²⁴ <http://apprenticeship.ednet.ns.ca/trades.shtml> (Dec, 15, 2007)

http://www.gnb.ca/0381/occupations_eng/mocrane.htm

7.1. INITIATIVES WITH GOOD POTENTIAL ARE UNDERWAY

The changes being made at NSCC outlined below correspond with recommendations made in the Canadian Home Builder's Association study, *A Revised Approach to a Human Resource Development Action Plan for the Residential Construction Industry*, April 2007.

Changes are taking place, with the development of programs such as O2 at the high school level, as well as adjustments to the format/structure of community college learning. Labour shortages are creating the need for new solutions, and NSCC has responded with its strategic plan that emphasizes Portfolio Learning. This will allow the College to deliver more flexible programming opportunities to meet the needs of Nova Scotia's learners and businesses.

The NSCC's strategy includes opening doors for students via foreign credential recognition and Prior Learning Assessment & Recognition (PLAR). The NSCC intends to offer help to employers to develop means to attract employees, including Nova Scotians approaching retirement. (NSCC Strategic Plan 2006)

Prior Learning Assessment and Recognition (PLAR) and portfolio learning helps the students progress more quickly through NSCC programs, and in that sense helps employers by moving them through the NSCC more quickly. However, while PLAR gives the students credentials based on experience, it does not give them new skills or the equivalent of the on-the-job training. PLAR programs may be, in part, what raise the expectations of students with respect to wages.

Essentially, NSCC is working to meet industry needs by creating a variety of flexible learning options and opportunities, with the goal of facilitating student acquisition of certification. *It is dependent upon input and cooperation from the industry in order to maximize its effectiveness.*

The following sub-sections provide our conclusions with respect to emerging issues in human resource planning and labour force training and recommendations to mitigate the impact of the labour force supply issues.

7.2. OUTSTANDING INFORMATION NEEDS

Secondary source was very limited. Normally such a situation would call for primary research to collect baseline information on the sector. However, the small number of businesses in the sector made it difficult for our interviewees to provide detailed information. Given the small number, even aggregated data could reveal confidential information about the larger firms. Therefore, it would be more practical to conduct a benchmarking study of the sector in larger

jurisdictions. The Nova Scotia firms could then use this information to improve their business strategies.

Recommendation 6: Conduct a benchmarking study of the sector in larger jurisdictions to see what experiences they have had with respect to recruitment, retention, education and skills development recently. Often issues encountered in larger centres of Canada are a precursor for trends that will move into the Atlantic region.

More information is needed regarding, for example, members of the workforce who would like to be involved in residential construction but presently are not because they do not have the time or money available to retrain. Someone who has family responsibilities, for example, cannot simply leave his or her current job to train in a campus-based portion of their apprenticeship program, and then be placed in a job with a potentially lower income.

Programs to help address this sort of transition would be an asset, and it is starting to be addressed by NSCC through flexibility in course locations and times.

Recommendation 7: Research the potential of retraining people in the workforce who are interested in construction, but are constrained by other commitments.

The Wood Manufacturing Council has created the Career Focus Program, which offers employers from the advanced wood products processing sector an opportunity to receive a wage subsidy to hire skilled youth on a 6-12 month placement. Information pertaining to more incentives and programs such as these would benefit the industry, with respect to programs already in existence and / or new programs that industry can suggest, based on individual needs and experiences.

The NSCC mission is to “build sustainable partnerships and provide innovative solutions which foster success, economic prosperity and quality of life in our local and global communities.” As a means of accomplishing their mission, NSCC offers customized training to business, not-for-profit organizations and government clients. Individual businesses have the opportunity to partner with professional training consultants to develop a program that meets their unique needs. Likewise, the CMHI and the sector council itself are in a position to provide access to specific training opportunities where needs are identified.

Recommendation 8: More information sharing regarding the needs of businesses will support delivery of training.

7.3. SUPPORT TO INDIVIDUALS FOR RETRAINING

Our anecdotal interviews indicated that there are members of the labour force age group who would be willing to retrain to enter the construction trades. However, many of these people at the stage of their life cycle that they cannot

afford to quit a job and forego income during training, even though in the long-term they would be financially better off. Short-term cash flow needs can often prevent individuals from reaching long-term goals. Bridging financial assistance programs for people re-training could expand the pool of potential entrants into the skilled trades. Also the older people get/the more responsibility they accumulate, the higher their income needs/expectations. Retraining someone for \$10/hr seasonal or contract work is not likely to be a successful strategy.

Recommendation 9: Develop proposals and advocate for government-supported financial assistance programs to help people re-train for construction trades.

7.4. SUPPORT TO INDUSTRY FOR HIRING

In Nova Scotia a new Youth Apprenticeship Program will introduce high school students to occupations in trades, and then allow those who want to explore trades and start their career training early to take advantage of apprenticeship while they complete their high school graduation requirements.²⁵ While the minimum age for registering apprentices has been lowered from age 19 to 16, the program is still in the development stage. Employers are advised to contact the Apprenticeship Training and Skill Development Branch of the NS Department of Education for more information.²⁶

General labourers may or may not have had job-specific training before being hired. Most of these workers need on-the-job training once employed, and the time required to do so depends upon the skills or duties assigned to the individual. Businesses would prefer to have community colleges provide more hands-on learning experience, to lessen the cost that businesses incur during this time and to accelerate any on-the-job training that may be unique to a particular firm.

Apprentices may fall into this category, especially if the education received did not provide the hands-on opportunities required by the employer. However, that training may be specific to Original Equipment Manufacturer's (OEM) equipment and therefore it is not economical for the NSCC to set up its own customized training.

Recommendation 10: Survey industry employers to determine the type and extent of hands-on, technology-specific training that is not currently being provided by the NSCC.

Recommendation 11: The AHB&RSC should then meet with the NSCC School of Trades & Technology to determine if the desired hands-on experience is generic

²⁵ <http://www.workitns.ca/employerwhatis.php> (Dec. 15, 2007)

²⁶ http://www.ednet.ns.ca/index.php?sid=921118273&t=sub_pages&cat=14; Dec. 15, 2007

enough to the construction industry to justify costs for enhanced or new programming.

Recommendation 12: Advise employers to contact the OEMs and determine if they provide training and support for their products. In some cases, the purchase agreement for equipment and service contracts include options for sending employees to central locations where the equipment companies sponsor training.

Recommendation 13: The federal and provincial governments have discontinued direct support for technology training, however the AHB&RSC should consider advocating re-establishment of technology training for employees in conjunction with the Association of Sector Councils at the provincial and national levels.

There are incentive programs that benefit employers that hire apprentices in the 45 Red Seal trades. The programs include the:

- Apprentice Incentive Grant;
- Apprentice Job Creation Tax Credit; and
- Tools Tax Deduction for individuals who are employed tradespersons²⁷

7.5. INDUSTRY INVOLVEMENT IN TRAINING

During discussions at a WoodLINKS (an industry education partnership) presentation, held in September 2007 at the NSCC campus in Dartmouth, NS, industry representatives agreed there is a disconnection between the “clean” environment of the NSCC campuses and the work site.

Attendees at the presentation suggested that the disconnect could be mitigated if industry became actively involved in matters concerning curriculum development, promotion of the trades as a career. This is also a focus of *Apprentice: Achieving Excellence through Partnership (December 2002)*, wherein the province addressed the need for more trades people.

However, attendees also suggested that industry in Nova Scotia may not see the labour supply situation as “bad” enough to change its approach to training and partnerships with the NSCC and other training organisations.

²⁷ The new tradesperson's tools deduction provides employed tradespersons with an annual deduction of up to \$500 to help cover the cost of new tools necessary to their trade. The deduction applies to the total cost of eligible tools if the following conditions are met:

- * the total cost exceeds \$1,000;
- * the tools were bought after May 1, 2006;
- * the purchase was made by an employed tradesperson.

www.cra-arc.gc.ca/whatsnew/tools-e.html

For example (outside of WoodLINKS), an industry representative from Alberta, where labour shortages are more severe than in Nova Scotia, reported in the *Review of Changes to Apprenticeship Training (January 2007 Update)* that builder participation and lack of committed volunteer leaders is a big obstacle to overcome.

7.6. INCREASE EXPOSURE TO THE SKILLED TRADES IN HIGH SCHOOLS

Our research indicates that more needs to be done to expose high school students to the skilled trades as career choices.

Programs such as Options and Opportunities (O2) have been developed and their implementation in Nova Scotia high schools has commenced. It offers students more hands-on learning experiences via cooperative work placements, to help them make the transition from high school to the next step on their career path.²⁸

With 10% of Nova Scotian students not completing high school, programs such as O2 have the potential to capture potential dropouts who may not be interested in standard curriculum. Exploring skilled trades through work-based experience might help these individuals find relevance in high school education.

Students enrolled in O2 programs have facilitated access to NSCC programs so they can “test drive” careers before enrolling in their programs.

7.7. CURRENT EFFORTS TO INCREASE THE PROFILE OF APPRENTICESHIP TRAINING

“Achieving Excellence ‘02” concludes that apprenticeships provide the most effective methodology for transfer and development of skills and the best value for the government’s investment in training.

The Provincial Apprentice Board is developing a range of initiatives that should help raise the profile of, and increase access to, apprenticeship training and entry into the skilled trades. The initiatives include:

- Changes to the Apprenticeship and Trades Qualifications Act (legislation that governs apprenticeship in NS) that allow persons between 16-19 years of age to register as Youth Apprentices;
- Hiring a Youth Apprenticeship Coordinator (YAC) by the Department of Education to work with the schools through Cooperative Education Teachers & Guidance Counsellors and Community Based Learning Consultants to promote apprenticeship and the skilled trades;

²⁸ Options and Opportunities (O2) offers students a more hands-on learning experience. It’s designed to help them make successful transitions from high school to work, a career path or a post-secondary program. <http://www.ednet.ns.ca/O2/e/index.shtml>

- Youth Apprenticeship Program funding to school boards to promote apprenticeship and provide opportunities for career exploration in the trades;
- Career exploration opportunities and placements are provided to students through Cooperative Education and the Options and Opportunities (O2) programs (www.ednet.ns.ca/O2);
- In-class presentations;
- Information provided through website at www.workitns.ca;
- The Invest in Youth initiative (www.investinyouth.ca) that provides schools with access to a database of over 5,500 employers that have agreed to engage high school students to promote career options in a variety of professional, technical, and skilled trades areas; (The engagements include in class talks/presentations, job shadowing, coop placements, etc.); and
- Collaborative Apprenticeship pilot projects (partners include the Department of Education, NSCC and industry) provide opportunities for youth to explore the trades and help employers recruit potential employees/tradespersons.

7.8. EXISTING EDUCATION AND TRAINING OPTIONS

As part of our research, we interviewed a number of industry stakeholders to explore specific education and training options that are unique to the factory-built subsector of residential construction and the skills sets required of these workers. Emerging from this are three levels of programming aimed at the factory-built industry. These are offered though:

- Canadian Manufactured Housing Institute (CMHI) and Local Associations,
- The Manufactured Housing Association of Atlantic Canada (MHAAC),
- Training options that are not specific to factory building, and
- Various company initiatives.

These are discussed below.

Canadian Manufactured Housing Institute (CMHI) and Local Associations: CMHI and local associations in Atlantic Canada run programs developed by CMHI in conjunction with CMHC for the factory-built subsector. These are largely focused on product information and sales, customer service and safety in the workplace.

The core program is the two-day Manufactured Housing Consultant course. Within this program a trainer authorized by CMHI travels to regions of Canada when there is sufficient demand to warrant a course. Usually the minimum

number of participants is 15 and the core program is offered between two to four times per year in Atlantic Canada.

Through CMHI, there is also a new trades-related training video (DVD) on how to site a surface mount a factory built home. The video provides support for on-the-job mentoring and training. The target audience is primarily local crews that work with retailers, although installers from the manufacturer will also benefit from the updated information.

The Manufactured Housing Association of Atlantic Canada (MHAAC): In New Brunswick, the MHAAC also runs a more general customer service course (how to deal with residential housing industry) and a course entitled 55+ (aimed at the retail end, specifically focused on so called ‘empty-nesters’ who may be interested in a variety of housing options). These are relevant to the factory-built retail subsector of residential construction, but are not specific to this sector.

Most importantly, MHAAC has been working with the New Brunswick Department of Education to get skilled trades back in the curriculum for high schools and to increase the capacity in community college system. The MHAAC is talking to officials with Nova Scotia Department of Education as well, but with five of the manufactured housing plants located in New Brunswick, focus on that province makes more sense. For example, it is easier for the education system to offer as part of their programs site visits to plants, internships and on-the-job training, all with close proximity to a number of campuses. Although this plan is still under review in New Brunswick, one company, at least, enables students to spend a couple of weeks working as a carpenter or electrician, etc.

Company Initiatives: WoodLINKS²⁹, (the New Brunswick company that works with students and discussed earlier), worked out a plan with the principal of a local high school. They offer their own certification and they are working with the education system to establish Provincial recognition for what the students ultimately learn. As part of the program students go through a safety course (WHIMIS, basic safety), learn information about the partnering company, and do more than ‘job-shadowing.’ The effect is training delivered to the student as if they were starting work on the shop floor.

Students get basic training using tapelines, a variety of hand and assembly tools and they can go on to become coop-students in the facilities. This approach makes it easier for the students to learn about the work environment, learn what the trades are about, and the process may lead to more students going on to the community college and / or becoming apprentices.

Other company initiatives fall under the heading of on-the-job training. Most of the manufacturers do training on the job – they have their own internal training programs (formal and often informal training where younger or less experienced workers work under the mentorship and supervision of more senior workers). It is

²⁹ Woodlinks is not limited to factory-built housing.

easier for manufacturing plants to create special work-training areas for tasks such as in crack filling, dry walling, sanding and finishing. In theory, they could be doing the same for electrical and plumbing work to support apprenticeships, however provincial regulations limits this potential.

Not Specific to Factory Building: There are also small private schools in New Brunswick that specifically aim at getting people ready for certification as welders, electricians, finish carpenters. One company brings the course to the students in regions where there is demand. They find a local facility, set up shop, and put on a course where there are young people who are interested. These are not necessarily specific to factory home building but are nevertheless supportive of skills development in areas that the factory home builders could benefit from.

Most training in the factory-built subsector still happens informally. The unique skills – installing a site for surface mount foundation, installing a home on a surface mount foundation, getting the module off the truck and stitching homes together – these are skills taught on the job as people are hired. At this point, there is no definitive manual for this specialized work and each company carries out these functions slightly differently based on what they have learned through experience, their product needs and how they work best with the site crews that install their products.

There are of course specialized applications of traditional trades related skills, such as crane operation, but the certification training not specific to factory-built housing. People will take the generic crane operator skills and training from a community college or private school and then learn on the job in the factory-built subsector of residential construction.

Training for the Factory-built Housing Industry – A Special Opportunity for Women: George Brown College in Toronto offers a program in Construction Technologies and specifically promotes the factory-built manufacturing environment to draw women to the program. Unlike traditional construction work that moves from site to site and may be socially problematic for women entering the industry (perceived or otherwise), women see the factory-built segment as a more controlled environment with more supervision, cleaner, dryer, physical a more comfortable environment, and work that does not require driving to a different construction site every day. The benefits of regular work and regular location are supportive as well of women who are the primary care givers to their children and need to coordinate education and / or childcare needs.

7.9. EDUCATION AND TRAINING NEEDS

There are two sides to skills and knowledge needed in factory-built home manufacturing: the skills needed in the factory and the skills needed at the retail end and on-site. In this section, we present the needs reported in our primary research and consider the needs reported in the literature.

The following emerge as the main education and training needs of the sector:

- **Product Knowledge:** Retailers report that they need special product knowledge and they are interested in more than the current two-day course.
- **In Factory Exposure:** In the factory, employers need all the skills needed to erect a traditionally built home on-site. There is a need for modules to be added to existing programs in the community college systems, e.g., in carpentry — where the specific standards for factory-built work are not yet taught. There is a need for workshops/courses to enhance traditional trades training with physical hands on demonstrations of what is needed in the factory-built sector both in the factory and at the installation site. “There are different tools, different procedures, sliding and bolting things together.” Students should also receive “take-aways” (videos, manuals).
- **Specific Occupations and Skills:** Specific trades shortages were reported for dry-wallers, carpet and flooring installers, framing carpenters as well as general labourers needed to work under licensed trades people. The shortages vary community by community but there is a more acute need in urban areas where the labour pool is absorbed faster by local development. Again, within the manufacturing facilities, the companies need the same basic skills as the traditional onsite builders.
- **Apprenticeship Training:** Correspondingly, the apprenticeship programs need to be upgraded at the provincial level. (see Section **7.10 Delivery Options** for more detail).
- **Land Development:** Manufacturers noted their interest in land use and development issues, as some factory-built home manufacturers have their own development projects.
- **Green and Energy Awareness:** There is a need, particularly among the retailers of factory build homes, to have a better understanding of the green options associated with factory homes, from the energy consumptions to the products used. Likewise, there is a need among the builders of factory homes to be certified. As one factory builder says, “We’ve got a huge push to build green houses. Manufacturing and the retailers aren’t certifying their people and the on-site people have to be certified as well to maintain the integrity of the product.” These green issues will need to be built into the trades training and government will need to cooperate with industry to agree what standards are going to prevail.

7.10. DELIVERY OPTIONS

A close look at the skills and knowledge needed for the factory-built home industry shows that there are not many options for delivery of the specialized

skills, beyond what is currently being done (e.g. in the traditional trades and the on-the-job training).

While some informants recommended enhancements to community college programs as the preferred training delivery method, others acknowledged that much of the specialized training needs to be addressed in-house based on the experience of the particular company. Larger manufacturers have the option of creating their own “schools” or formal training systems, but most accept training-on-the job as the most efficient way to learn.

For transporters and installers, for example, there are rules and regulations, but there are no courses. The only delivery option is to learn from a mentor or supervisor. For the retailers who want more product knowledge, the preferred method of delivery is workshops and courses with more materials for reference: videos, manuals, etc.

We also explored the option for helping factories formalize some of their training needs to support a better or organized system of factory specific training; however, this potential solution did not resonate. As one builder puts it, bring us workers with construction experience, and we will do the rest.

7.11. LINK BETWEEN FACTORY AND ON SITE ACTIVITIES

Each manufacturing plant has its own plan for transporting factory-built homes or modular units. Once the module is on the foundations, the retailer arranges for a general contractor and a crew including one or more electricians, finish carpenters, plumbers, and roofing and siding specialists. The more established retailers have their own crew or good relationship with local contractors.

There is a need for a better link between factory and on-site activities, so that installation crews can become aware of the latest developments in rapid assembly. One area of concern among western manufacturers is the cross provincial border shipment of products and the need to be on top of prevailing building codes in the destination area. It seems onsite assembly may be more streamline if the builders are applying local code at the province of origin.

7.12. APPRENTICESHIP, HR & TRAINING NEEDS IN MANUFACTURED HOUSING

According to winter 2008 CHBA Pulse Survey, the two most often cited critical problems for new homebuilders in Atlantic Canada are trades/labour shortages and associated rising costs of trades/labour (see **Figure 2**).

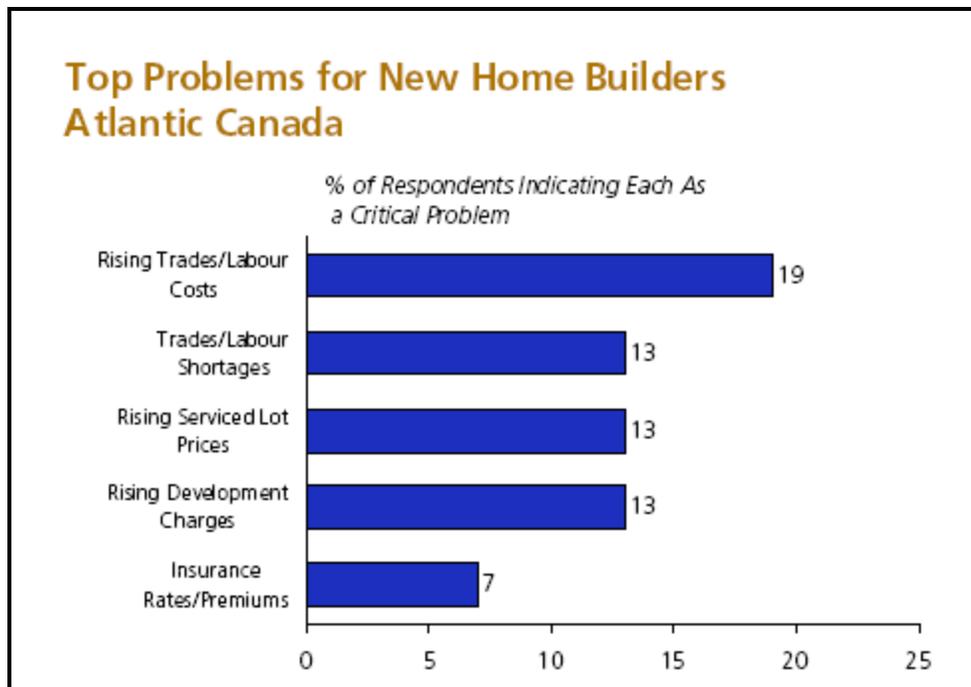


Figure 2 - Top Problems in Atlantic Canada³⁰

Consequently, apprenticeship programs need to be streamlined and modularized so that apprentices can become productive more quickly without the requirement for 1:1 journeyman mentors. An advantage of factory-built home manufacturing over on-site construction is that the controlled environment lends itself better to apprentice training than most conventional construction sites.

Another challenge in the residential construction industry identified in the 2003 CBHA Human Resource Development Plan was the need to address occupations that are unorganized, which are not apprenticeable, e.g., framers, tapers/drywallers, cribbers, stucco applicators, finishers and siding applicators.³¹ The 2003 Plan suggested that these occupations required industry agreement to become organized in preparation for planning appropriate training. Several years later, we are told the need is still there and it is growing.

However, there are additional distinct costs of apprenticeship training faced by the residential construction industry, both for traditional apprenticeable trades and for those occupations that have been accepted as apprenticeable. For example, many employers in the housing industry are small, and do not and cannot hire apprentices. In response, some housing industry associations have sponsored apprentices at their own cost. These special costs include finding

³⁰ CHBA Pulse Survey for the Winter, 2008 <www.chba.ca/AboutCHBA/pulse/2008/Winter08>

³¹ "A Revised Approach To A Human Resource Development Action Plan For The Residential Construction Industry," April, 2007 provided by CHBA

employment and on-the-job training, maintaining records of training and reporting to Apprenticeship authorities as required."³²

In reference to issues around recruitment, one informant stated that the "ideal future is the old system in New Brunswick (circa 1975)" – students could take half a day for training in a two year course, 5-days a week, including placement with companies. Students graduated with a high school diploma and worked toward their licenses as a plumber, electrician or carpenter.

People that learn in the factory-built environment may reach the end of the program better trained because site conditions are more controlled. The work has to be exact when it goes into the field. The factory-built housing environment is ideal for apprentices. However, "the restrictive 1:1 journeyperson to apprentice ratio hampers the industry's ability to provide training."³³

To address this problem, the apprenticeship boards should give qualified trades workers some recognition as potential mentors to apprentices as long as access to journeypersons exists within an organization. For example, a third year apprentice could mentor a first year apprentice. There are many highly skilled but uncertified workers who are capable of providing training but who are unable to because of provincial apprenticeship standards.

Based on comments from Western based manufacturers, interprovincial qualifications and certification for skilled workers is important to the growth of the sector. Western factory home builders have told us that they need:

- skilled workers who understand building codes in destination markets outside their own province, and
- more technically informed sales people at the retail end, with a better understanding of options for consumers, particularly in the area of green building methods and energy efficient building and certification.

Other needs related to transportation costs. Builders are telling us that governments need an understanding of the impacts of transport regulations on the sector (particularly as it relates to load sizes)

7.13. INDUSTRY SUGGESTIONS

The following suggestions to help reduce the impact of forthcoming labour shortages were offered by the firms we contacted during this study:

- The NSCC cannot be expected to own all types of equipment and should therefore coordinate with businesses to train at their premises.

³² "A Revised Approach To A Human Resource Development Action Plan For The Residential Construction Industry," April, 2007 provided by CHBA

³³ "Summary of Provincial Association Responses about Issues and Priorities for Apprenticeship Reform" March, 2007 provided by CHBA

- Examine business owner awareness and practices with respect to HR strategies and identify the impact of these strategies on the workforce. For example, what is the impact of business hiring practice on an individual workers and their achievement of their certification? How does this affect the long-term relationship with the employee and their individual perspectives on their work? Are they in a job or are they in a career?

Training and education programs are needed to help business understand what motivates workers to change jobs in Nova Scotia and migrate to jobs outside the province.

- Explore the opportunities to have more government-sponsored apprenticeship/shared wages programs.
- Provide more in-depth safety skills training, which would improve the quality of life at the workplace and improve productivity. The Nova Scotia Community College offers SAFE 1000 and SAFE 1001, which provide a basic introduction to Occupational Health & Safety (OH&S) and Workplace Hazardous Materials Information System (WHMIS) but more needs to be done.
- Expand what is being done with respect to promotion and awareness of the trades, particularly among the young. Provide “workshop” training at businesses, which would give students the opportunity to:
 - see the skills and machinery in use;
 - gain much needed hands on experience;
 - see the relevance of classroom education and training.
- Help students create a portfolio so employers can see samples of their work. It would be beneficial to applicants to have a properly formatted resume/portfolio.
- Compile human resources needs to create an “employee bank” that lists the names of retired or semi-retired people who have the skills required by Manufactured Housing and are willing to act as advisors.
- Explore the adoption of technology as a strategy to become less reliant on low wages or labour productivity.
- Explore the extent to which ‘in factory’ training and task specialization can open the sector to less skilled labour pools.
- Explore the extent to which factories can be located in, for example, rural areas, where there less competition for labour and remain competitive in the marketplace.

- Conduct 'census' level collection of baseline data from participants in the manufactured housing sector, perhaps using the broader working definition of the sector as used in this study.

In addition to these suggestions we add the following:

Recent studies indicate that nearly 60% of ICI workers would recommend a career in ICI construction to their own children and slightly more workers would recommend a career in ICI construction to other family members over their own children. If the same holds true for the residential sector, it represents thousands of existing workers across all the construction trades that could potentially serve as reference points for people considering the field.

Recommendation 14: The AHB&RSC, along with other sector organizations, could create a volunteer mentor program ranging from visits to schools, Internet chat rooms and discussion boards, and on-the-job mentoring for new and part-time entrants.

There are several factors that support such an approach:

- The time required for participation could be as little as a few hours every month, especially if the activity can be done over a home computer.
- Amongst those who would recommend the industry and their particular trade, there are likely many who are old enough to want help younger people through their challenges. They would like to leave a legacy and share their sense of satisfaction.

Recommendation 15: Getting the trades back into the schools and colleges is the most important initiative to alleviate current and projected labour shortages.

Recommendation 16: "It is imperative that provincial apprenticeship authorities recognize and designate specialty residential construction trades that currently are not recognized among the traditional construction trades."³⁴

Recommendation 17: Local associations should urge more apprenticeship reform to organize the carpentry trades and speed up the process for modular certifications.

Recommendation 18: Local HBAs should urge provincial governments to consider funding contributions for in-factory training in the skills required to support manufactured housing.

³⁴ "Summary of Provincial Association Responses about Issues and Priorities for Apprenticeship Reform" March, 2007 provided by CHBA

Recommendation 19: Apprenticeship boards should give qualified trades workers recognition as potential mentors to apprentices as long as access to journeypersons exists within an organization.

APPENDIX A – BIBLIOGRAPHY

A Revised Approach to a Human Resource Development Action Plan for The Residential Construction Industry; Canadian Home Builders' Association, April 2007

An Energy Efficiency Action Plan for the Factory-Built Housing Industry: Consultation Report; Canadian Manufactured Housing Institute, May 2004

Current Trends in Factory-Built Housing; Welford Sanders, Urban Land, March 1997

Factory and Site-Building: A Comparison for the 21st Century; Prepared by NAHB Research Center, Inc. for the U.S. Department of Housing and Urban Development, October 1998

Factory Built Housing Roadmap (Including Recommendations for Energy Research); Prepared by the Manufactured Housing Research Alliance for the U.S. Department of Housing and Urban Development, January 2006

Manufactured Housing Production Process; Ayman Abu Hammad, University of Cincinnati, Makarand Hastak, Purdue University and Matt Syal, Michigan State University, September 2002

Ontario's Value-Added Wood Products Market Potential in the U.S. Great Lakes States, Peter Norman, Altus Clayton in association with Woodbridge Associates Inc., July 2003

Opportunities to Improve Manufactured Housing Through the Use of Advanced Adhesives and Sealants; Prepared by the Manufactured Housing Research Alliance for the U.S. Department of Housing and Urban Development, January 2003

Pilot Study: Applying Lean Principles to Factory Home Building; Prepared by the Manufactured Housing Research Alliance for the U.S. Department of Housing and Urban Development, July 2007

Profile and Prospect of the Factory-Built Housing Industry in Canada, CMHC and Altus Group, March 31, 2006

Pulse CHBA Pool: Atlantic Canada Home Builders Forecast Slight Moderation in Housing Starts and Stronger Renovation Activity, Canadian Home Builders' Association

Simulation Modelling of Manufactured Housing Processes; Ayman Abdallah Abu Hammad, the University of Cincinnati: Department of Civil and Environmental Engineering, 2001

Summary of Provincial Association Responses about Issues and Priorities for Apprenticeship Reform, Canadian Home Builders' Association

The Future of Manufactured Housing; Kimberly Vermeer and Josephine Louie, Harvard University: Joint Center for Housing Studies, January 1997

Towards Industrialized Construction; D.W. Finn, Construction Canada, May 1992

Using Prefabrication in Housing; CMHC, Currently on CMHC Website:
<http://www.cmhc.ca/en/inpr/imhoaf/afhoid/cote/usprho/index.cfm>

APPENDIX B – INDUSTRY ROADMAP

The following is a Road Map of Nova Scotian businesses involved in log, timber frame, kit home production and panel production. Note that it is possible that more producers of wall panels are active in NS but it is difficult to find them.

Dow & Duggan Log Homes International Limited

(pre-cut log homes)

Mailing and Location Address:

1800 Prospect Road
Hatchett Lake, Nova Scotia B3T 1P9

Tel: (902) 852-2559

Fax: (902) 852-3100

E-mail: dowandduggan@eastlink.ca

Web: www.dowandduggan.ca

Enfield Home Hardware Building Centre

(kitchen cabinets equipment & accessories household, windows & installations)

Mailing Address:

264 Highway 2
Enfield, Nova Scotia B2T 1C9

Tel: (902) 883-4663

Fall River Log Homes

(pre-cut kits)

Mailing and Location Address:

3447 Highway 2
Fall River, Nova Scotia B2T 1J2

Tel: (902) 860-1646

Web: www.FallRiverLogHomes.com

Great Ocean Custom Log Homes Inc.

(builders and contractors)

Mailing Address:

RR 1, Petite Riviere
Petite-Riviere-Bridge, Nova Scotia B0J 2P0

Tel: (902) 688-2928

Halliday Flooring

(prefabricated buildings & houses; trusses, rafters & beams; wooden wall sections)

Mailing and Location Address:

184 Arthur Street
Truro, Nova Scotia B2N 1Y4

Tel: (902) 895-5436

Heartwood Log Homes Ltd.

(log homes, buildings & cabins, contractors)

Mailing Address:

1624 Stronach Mtn. Rd
Margaretsville, Nova Scotia B0S 1N0

Location (production) Address:

232 Forest Glade
Margaretsville, Nova Scotia B0S 1N0

Tel: (902) 765-6596

E-mail: roger@heartwood-log-homes.com

Web: www.heartwood-log-homes.com

Interhabs Ltd.

(pre-cut and pre-fabricated homes and cottages, building contractors)

Mailing Address:

Historic Properties
1869 Upper Water Street
Halifax, Nova Scotia B3J 1S9

Tel: (902) 422-2121

E-mail: info@interhabs.ns.ca

Web: www.interhabs.ns.ca

J.A.G. Trusses & Prefabricated Walls

(prefabricated trusses and walls)

Mailing and Location Address:

987 Bligh Road Extension
Coldbrook, Nova Scotia B4R1A7

Tel: (902) 679-5462

Kenomee Log Homes Ltd

(log homes)

Mailing Address:

R.R.#1
Upper Economy, Nova Scotia B0M 1J0

Tel: (800) 565-0882 & (902) 647-2080

Web: www.kenomee.com

Legacy Timber Frames Ltd.

(timber frames homes)

Mailing and Location Address:

10130 Highway 221
Canning, NS B0P1H0

Tel: (902) 582-3423 / (902) 582-3475

MacPherson Bros. Bldg. Supplies Ltd.

(trusses and joists, panels on request)

Mailing and Location Address:

2907 Roaches Rd.

New Waterford, Nova Scotia B1H 1N3

Tel: (902) 862-7107

Fax: (902) 862-8473

E-mail: hugh.macpherson@ns.sympatico.ca

Web: <http://www.canadawoodhousing-mbbs.com>

Stewiacke Home Hardware Building Centre (wall panels)

(kitchen cabinets equipment & accessories household, windows & installations)

Mailing Address:

P.O. Box 209

Stewiacke, Nova Scotia B0N 2J0

Location Address: 275 George St.

Stewiacke, Nova Scotia B0N 2J0

Tel: (902) 639-2347 & (800) 667-0442

Fax: (902) 639-2270

E-mail: shhbc@stewiackehomehardware.com

Web: <http://www.stewiackehomehardware.com>

Stockade Style Log Homes

(custom log home packages)

Mailing and Location Address:

2090 Brow Mountain Road

Berwick, NS B0P 1E0

Tel: (902) 538-7148 & (866) 538-7148

Web: stockadestyleloghomes@ns.sympatico.ca

Timberstone Log Homes Ltd

(pre-cut & pre-engineered log homes and cottages, log beams, furniture)

Mailing Address:

RR 1

Kentville, Nova Scotia B4N 3V7

Location Address:

1505 Harrington Road

Kentville, Nova Scotia B4N 3V7

Tel: (902) 538-7898 & (866) 240-0277

Fax: (902) 538-7792

E-mail: timberstone@ns.sympatico.ca

Web: www.stockadestyleloghomes.ca

Scotian Homes

(on-site construction, partnered with Supreme Homes – New Minas)

Mailing and Location Address:

264 Highway 2
Enfield, Nova Scotia B2T 1C9

Tel: (902) 883-2266

Fax: (902) 883-2155

Web: scotianhomes.com

Timberhart Woodworks (formerly Acorn Timber Frames)
(timber frame homes)

Mailing Address:

P.O. Box 130
Port Williams, Nova Scotia BOP 1T0

Location Address:

1164 Parkway Dr.
Port Williams, Nova Scotia, Canada BOP 1T0

Tel.: (902) 542-3838 & (866) 395-3838

Fax: (902) 542-7917

E-mail: info@timberhart.com

Web: www.timberhart.com

Timberstone Log Homes Ltd

(log homes, furniture, pre-fabricated open-timber homes, signage)

Mailing Address:

RR 1, 1505 Harrington Rd.
Kentville, Nova Scotia B4N 3V7

Location Address: 1505 Harrington Rd.
Kentville, Nova Scotia B4N 3V7

Tel: (902) 538-7898 & (866) 240-0277

Fax: (902) 538-7792

E-mail: info@timberstoneloghomes.com

Web: <http://www.TimberstoneLogHomes.com>

APPENDIX C – WAGE INFORMATION

NOC code: 7311

Occupation: Construction Millwrights and Industrial Mechanics (Except Textile)

Area: Show All Areas - Nova Scotia

Results Generated on: October 25, 2007

Area	<u>Average Wage</u> (\$ / hour)	<u>High Wage</u> (\$ / hour)	<u>Low Wage</u> (\$ / hour)	<u>Reference period</u>
Annapolis Valley	22.90	29.00	11.25	2006/07
Antigonish / Pictou / Guysborough	18.22	27.30	11.16	2006/7
Cape Breton Network	22.00	29.86	14.75	2006/7
Colchester / Cumberland	18.22	27.30	11.16	2006/07
Halifax and surrounding areas	21.00	27.00	13.00	2006/7
South Shore	22.90	29.00	11.25	2006/07
Southwest Nova Scotia	22.90	29.00	11.25	2006/07

NOC code: 7611

Occupation: Construction Trades Helpers and Labourers

Area: Show All Areas - Nova Scotia

Results Generated on: October 25, 2007

Area	<u>Average Wage</u> (\$ / hour)	<u>High Wage</u> (\$ / hour)	<u>Low Wage</u> (\$ / hour)	<u>Reference period</u>
Annapolis Valley	12.75	19.05	8.00	2006/07
Antigonish / Pictou / Guysborough	11.76	15.68	8.05	2006/7
Cape Breton Network	12.00	27.30	7.60	2006/7
Colchester / Cumberland	11.76	15.68	8.05	2006/07
Halifax and surrounding areas	14.75	21.00	9.50	2006/7
South Shore	12.75	19.05	8.00	2006/07
Southwest Nova Scotia	12.75	19.05	8.00	2006/07

NOC code: 7371

Occupation: Crane Operators

Area: Show All Areas - Nova Scotia

Results Generated on: October 25, 2007

Area	<u>Average Wage</u> (\$ / hour)	<u>High Wage</u> (\$ / hour)	<u>Low Wage</u> (\$ / hour)	<u>Reference period</u>
Annapolis Valley	22.70	29.35	11.50	2006/07

Antigonish / Pictou / Guysborough	18.71	27.71	12.80	2006/7
Cape Breton Network	21.83	28.29	14.33	2006/07
Colchester / Cumberland	18.71	27.71	12.80	2006/07
Halifax and surrounding areas	21.79	33.65	11.66	2006/7
South Shore	22.70	29.35	11.50	2006/07
Southwest Nova Scotia	22.70	29.35	11.50	2006/07

NOC code: 7421

Occupation: Heavy Equipment Operators (Except Crane)

Area: Show All Areas - Nova Scotia

Results Generated on: October 25, 2007

Area	<u>Average Wage</u> (\$ / hour)	<u>High Wage</u> (\$ / hour)	<u>Low Wage</u> (\$ / hour)	<u>Reference period</u>
Annapolis Valley	14.75	22.15	10.70	2006/07
Antigonish / Pictou / Guysborough	15.92	24.26	10.42	2006/7
Cape Breton Network	17.00	28.00	12.00	2006/07
Colchester / Cumberland	15.92	24.26	10.42	2006/07
Halifax and surrounding areas	17.00	23.00	11.75	2006/7
South Shore	14.75	22.15	10.70	2006/07
Southwest Nova Scotia	14.75	22.15	10.70	2006/07

NOC code: 7411

Occupation: Truck Drivers

Area: Show All Areas - Nova Scotia

Results Generated on: October 25, 2007

Area	<u>Average Wage</u> (\$ / hour)	<u>High Wage</u> (\$ / hour)	<u>Low Wage</u> (\$ / hour)	<u>Reference period</u>
Annapolis Valley	16.10	24.00	10.00	2006/07
Antigonish / Pictou / Guysborough	14.25	22.40	8.50	2006/7
Cape Breton Network	15.00	22.00	9.00	2006/07
Colchester / Cumberland	14.25	22.40	8.50	2006/07
Halifax and surrounding areas	16.00	21.80	10.40	2006/7
South Shore	16.10	24.00	10.00	2006/07
Southwest Nova Scotia	16.10	24.00	10.00	2006/07

NOC code: 7219

Occupation: Contractors and Supervisors, Other Construction Trades, Installers, Repairers and Servicers

Area: Show All Areas - Nova Scotia

Results Generated on: October 25, 2007

Area	<u>Average Wage</u> (\$ / hour)	<u>High Wage</u> (\$ / hour)	<u>Low Wage</u> (\$ / hour)	<u>Reference period</u>
Annapolis Valley	18.20	25.60	10.70	2006/07
Antigonish / Pictou / Guysborough	14.25	24.60	10.50	2006/7
Cape Breton Network	19.70	24.60	12.50	2006/7
Colchester / Cumberland	14.25	24.60	10.50	2006/07
Halifax and surrounding areas	21.00	25.00	17.00	2006/7
South Shore	18.20	25.60	10.70	2006/07
Southwest Nova Scotia	18.20	25.60	10.70	2006/07

NOC code: 0711

Occupation: Construction Managers

Area: Show All Areas - Nova Scotia

Results Generated on: October 25, 2007

Area	<u>Average Wage</u> (\$ / hour)	<u>High Wage</u> (\$ / hour)	<u>Low Wage</u> (\$ / hour)	<u>Reference period</u>
Annapolis Valley	25.45	32.25	14.00	2006/07
Antigonish / Pictou / Guysborough	23.90	33.84	12.50	2006/7
Cape Breton Network	24.00	40.72	15.00	2006/7
Colchester / Cumberland	23.90	33.84	12.50	2006/7
Halifax and surrounding areas	26.40	43.20	12.66	2006/07
South Shore	25.45	32.25	14.00	2006/07
Southwest Nova Scotia	25.45	32.25	14.00	2006/07

APPENDIX D – TECHNOLOGY