

Driving the **Automotive Industry** Into the Future





We would like to thank everyone who contributed their time, ideas and expertise to Driving the Windsor-Essex Automobile Industry Into the Future. This report represents the collaborative efforts of those involved in the Windsor-Essex automotive industry. The aim of this report is to educate the community on the employment opportunities within the automotive industry.

Workforce WindsorEssex would also like to thank Jeanine Lassaline-Berglund for their work in developing and authoring this report.

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Workforce WindsorEssex is committed to ongoing research to enhance local labour market planning in the Windsor-Essex region.

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Executive Summary

Through support provided by the Ontario Ministry of Training, Colleges and Universities, Workforce WindsorEssex conducted a year-long research project examining the impact of emerging technologies on the workforce requirements of the Windsor-Essex automotive sector. Workforce WindsorEssex conducted over 25 consultations with employers, industry associations, education representatives and other key stakeholders.

Overall, the employers who participated stated that they are optimistic about growth in the sector. With the strong foundation in the automotive sector locally, employers are looking for innovative ways to incorporate new technologies to increase the fuel efficiency of vehicles as well as respond to customer demands.

This report and accompanying bulletin and video highlight the current and future trends in the automotive sector. For example, robotics, 3D printing, lightweighting, etc. are processes that some Windsor-Essex manufacturers are using to promote innovation and create new products and processes.

There are several education and training programs in Windsor-Essex that will prepare the workforce for using these technologies, products and processes. A list of available programs can be found at the end of the report.

Introduction

“The Windsor-Essex region is the automotive capital of Canada and a strategic North American centre for automotive parts and equipment.”¹ Because of this expertise, in the past the workforce and economy in Windsor-Essex were centered in the automotive industry. In 2000, there were 49,400 people employed in manufacturing in the Windsor CMA (Windsor, Tecumseh, Lakeshore, Amherstburg, Lasalle). When the economic recession occurred in 2008, the automotive industry in Windsor-Essex was hit particularly hard. Throughout and after the recession and profit losses, the major automotive companies began to downsize. This also led to downsizing with suppliers, and some companies downsized or closed. In 2010, there were 29,600 employees in the manufacturing sector. The workforce in the industry was reduced by approximately 20,000 workers.

Beginning in late 2011, mold, tool, die and machining employers who supplied the automotive sector began to show signs of growth. From 2012 through 2014, local employers are experiencing challenges finding the skilled workforce they require. Automotive analyst, Dennis DesRosiers has confirmed in multiple presentations in 2013 and 2014 that the automotive industry is looking ahead to significant growth and that the next 5 to 8 years will be the best years the industry has experience.²

Automakers are also looking to diversify and expand their lines of products. It is projected that automakers will release between 60 and 70 new lines a year for the next 3 to 5 years, which is up considerably from the forty to fifty models each year in the years previous to the 2008 economic recession.

In addition to this projected growth, there have been new regulations implemented regarding fuel economy. By 2025, all vehicles produced in North America will have to maintain 54.5 miles per gallon combined fuel economy. This new regulation will require innovation and engineering to achieve this mandate. Automakers are looking for new and innovative ideas from their workforce to solve this challenge through developing new materials and designs. With Windsor-Essex being the automotive capital, it is well-positioned to conduct this research and development to increase fuel economy within vehicles.

The projected industry growth combined with the necessary research and development will require a skilled and innovative workforce. The workforce required by the automotive sector currently and into the future is not the workforce that was employed in the sector in the past. The workforce that will help solve these challenges is highly skilled and educated. It will also require unique partnerships between employers and education. Key stakeholders who are involved in and knowledgeable of the sector are willing to participate in our research and provide important connections to other stakeholders.

Workforce WindsorEssex received funding from the Ontario Ministry of Training, Colleges and Universities to examine the transforming automotive sector in Windsor-Essex and the impacts of these transformations on the local workforce.

The fundamental questions to be answered by this research project include:

1. How can Windsor-Essex capitalize on its experience in the automotive industry to position itself favourably for the transforming industry?
2. What skills are employers within the industry looking for in candidates?
3. What are the potential partnerships for workforce development between employers and local educational institutions?
4. What information do students and/or job seekers need to know regarding required skills and experience if they are interested in working in the Automotive Industry?

¹ WindsorEssex Economic Development Corporation, “Advanced Manufacturing: Aerospace and Automotive.” Online. <http://www.choosewindsorEssex.com/?q=manufacturing>

² Dennis DeRosiers, Presentation at the Canadian Association of Mold Makers, Windsor.

Snapshot of Automotive Manufacturing in Windsor Essex Today

Light weighting of cars and automobile parts refers to the use of lightweight materials to increase the fuel economy of vehicles. Light weighting of vehicles is not a new phenomenon to the automotive sector. The oil and gas prices through the 1970's caused the industry to start exploring less traditional materials, replacing metal and steel with composite and lightweight materials during the construction of the automobile and the components within. The industry today is being required by the Canadian and American governments and consumers to adopt increasingly lightweight structures, components, and powertrain (which are the power generating components) in vehicles. The local impact of this trend will be gradual. The most significant impact will be the increasing landscape of competitiveness which is built on a manufacturers' abilities to partner with their customers to explore innovation. This is more significant at an **OEM** and **Tier one level**, but certainly not limited to them.

OEM stands for Original Equipment Manufacturer. These organizations build cars and vehicles. For example, Ford, Chrysler, GM

A Tier One Supplier provides parts and systems directly to the OEM.

Significant Factors Affecting Local Employment and Skill Development

Employers in the sector are facing challenges with an ageing workforce as well as a skills mismatch. Historically, the majority of the work in the automotive sector was large volumes of automotive production work. This type of work was generally dependent on a willingness to work for long hours in sometimes physically demanding positions, doing repetitive work. The average production worker had a grade 12 education, although this was not mandatory.

In the supply base, work in the mold, tool, and die sector was plentiful and skilled work. Often, it did not require a grade 12 education, but the absence of a formal secondary school diploma was replaced by the equally powerful trade certificate and ultimately, the journey-man paper, which signified that an apprentice had completed his or her apprenticeship successfully and acquired a trade skill.

In the latter part of the 1990's and into this century, there has been a shift from the path to an apprenticeship, in favour of more academic pursuits. Given the aging population of professionals in skilled and semi-skilled professions in the sector, this has, and will continue to put a great strain on finding the experiences and skills employers need.

Perceptions of poor working conditions, repetitive and physically demanding work and, long hours continue to plague the industry and make it a challenge to recruit local talent. Some believe the cause of this phenomenon is tied to the fact that the automotive industry has continued to experience some volatility as a result of economic conditions. Through the recent economic recession, local employers downsized resulting in job losses for some of those working in the sector.

The current landscape of the average automotive production and supplier organization is much different than that in the past. Moreover, we continue to see a change in the culture of these organizations. They have challenged their semi-skilled and skilled labour forces to realize their potential inside the organizations, to continue to learn new skills and to invest in continual improvement methodologies.

What this means for the sector is that a job in automotive manufacturing can be challenging, exciting, and a way to continue to develop skills and experience.

Other factors that affect the sector are innovation and continual improvement. Original Equipment Manufacturers (OEM's) continue to put pricing pressures on the automotive supply base, forcing automakers to look at operating standards that minimize costs. This kind of constant pressure has resulted in innovative solutions being identified and developed by local parts manufacturers. With these conditions, there has been an increase of automation and robotics, the replacement of traditional high-cost materials with better performing lower cost alternatives, a change in manual labour activity with a shift to conveyors, and vision systems for quality and functional performance checks of parts. It is likely that many people who currently work in the automotive sector have received training or skills development opportunities for using new technologies.

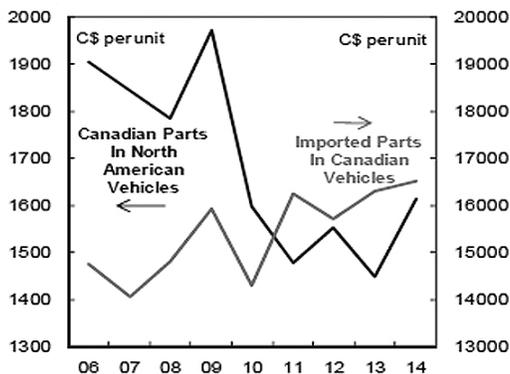
Market Conditions for Vehicle Manufacturers and Supply Chain

Several automotive analysts have predicted strong growth for the automotive sector in terms of the number of new models being built as well as increased sales.³ Older cars are still being used by consumers which, has created pent-up demand for purchasing new cars when the life cycle of the older car expires. This will result in increased sales until at least 2020.⁴

Vehicle production investment in Ontario continues to decline, but investments in the United States, Mexico and other countries are continuing to climb. This means that Canada has an extensive supply base and opportunity to supply the Tier One and OEMS into the next 20 years.

The graph below depicts the cost of Canadian Manufactured parts, in comparison with imported parts. The trend of growth in Canadian parts compared to imported parts indicates the potential growth. Although, in mid-2011, imported parts surpassed Canadian made parts for the industry, it is expected that use of Canadian parts is on the rise and expected to climb, due to pricing, foreign exchange and demand.

And Begins To Recover Lost Ground



Source: "Global Auto Report", Scotiabank Global Economics. October 31, 2014

³ Dennis DesRosiers, Windsor Mold Expo Presentation. Presentation. Windsor. October 29, 2014.

⁴ Dennis DesRosiers, Windsor Mold Expo Presentation. Presentation. Windsor. October 29, 2014.

Employment in the Automotive Sector in Windsor-Essex

In 2011, there were 7,140 people employed within the motor vehicle manufacturing industry in Windsor-Essex. Additionally, there were 5,065 people employed within the motor vehicle parts manufacturing industry.⁵

As of the 2011 National Household Survey, 4.7% of the Windsor-Essex workforce was employed as motor vehicle assemblers, inspectors, and testers.⁶ 6,890 people were employed as motor vehicle assemblers, inspectors and testers and 510 people employed as motor vehicle assembling supervisors.⁷

There were over 30 occupation classifications that are represented within the motor vehicle manufacturing, motor vehicle body and trailer manufacturing and motor vehicle parts manufacturing industries. A complete list of the occupation classifications can be found in Appendix A.

Below is a chart of the 2014 wages for those employed within the automotive Sector in Windsor-Essex.

Description	2014 Annual Average Earnings
Motor Vehicle Manufacturing	\$73,292
Motor vehicle body and trailer manufacturing	\$60,217
Motor vehicle parts manufacturing	\$49,779

Source: EMSI Analyst- 2014.3

Survey Results from the Industry Snapshot

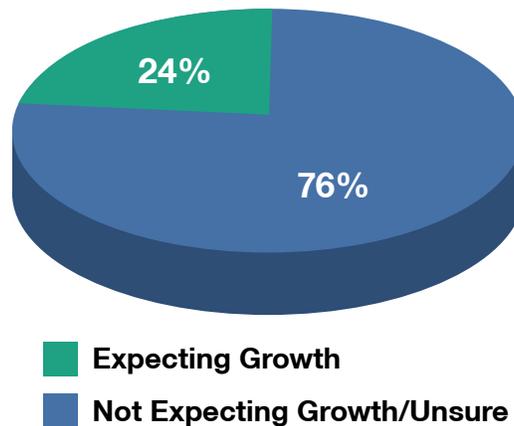
Workforce WindsorEssex conducted consultations with over 25 businesses and stakeholders involved in the automotive sector. Consultation with local employers in this sector revealed that there is confidence in the economic stability they are currently experiencing. Out of more than 25 participating local companies, 19 out of 25 employers indicated that they are experiencing growth. The remaining 6 companies indicated they are stabilizing after a long economic downturn, and it is important to note that the 6 remaining employers are not downsizing.

⁵ Statistics Canada, 2011 National Household Survey

⁶ Statistics Canada, 2011 National Household Survey

⁷ Statistics Canada, 2011 National Household Survey

Windsor-Essex Employers Outlook on Automotive Sector in 1 to 3 years



In addition, many of these organizations are investing in newer equipment, innovation in materials, and/or better processes in the manufacturing of their parts. This investment leads to a greater need for technical and professional skills for the future.

The results revealed the greatest growth is in more diversified organizations that are supplying different sub-sectors of the industry. For example, they may supply plastic injection molds, but also do assembly of parts and automation equipment. For others, they remain committed to a core set of products or processes.

Available positions have become harder to fill with qualified and experienced local talent. Some organizations currently have available positions that are taking in excess of 60 days to fill. A few employers expressed that they spent over a year looking to recruit a quality engineer that met their qualifications for technical skill and experience.

By identifying the occupations and trends in the industry, those individuals who are interested in opportunities can explore the required education and training available to prepare for these occupations.

Ageing Workforce

Several key occupations within the automotive sector are likely to be impacted with the ageing workforce combined with the challenges employers are experiencing of attracting people to the sector. Below is a chart of the age breakdowns of the occupations.

As identified in Table 1, senior managers, manufacturing managers, industrial and manufacturing engineers, electrical and electronics engineering technologists and technicians, motor vehicle assembling supervisors, and metalworking and forging machine operators are aging.

Of the businesses that participated in the consultation process, on average almost one in five workers within their businesses was aged 55 years or older.

Table 1: Age of Persons Employed in Related Occupations in Windsor-Essex

	Total -										% of workforce over the age of 50 years
	Population 15 years and over	15 to 24 years	25 to 29 years	30 to 34 years	35 to 39 years	40 to 44 years	45 to 49 years	50 to 54 years	55 to 59 years	60 to 64 years	
Senior managers - construction, transportation, production and utilities	380	0	0	0	0	45	25	120	100	25	64.5%
Manufacturing managers	1160	0	35	105	160	225	240	180	125	50	30.6%
Mechanical engineers	705	0	80	110	115	70	110	70	55	25	21.3%
Electrical and electronics engineers	210	0	0	0	25	40	40	25	25	0	23.8%
Industrial and manufacturing engineers	325	0	0	60	55	65	40	70	20	0	27.7%
Mechanical engineering technologists and technicians	470	25	70	80	75	100	45	25	45	0	14.9%
Industrial engineering and manufacturing technologists and technicians	300	0	0	30	70	90	45	30	30	0	20.0%
Electrical and electronics engineering technologists and technicians	265	0	25	25	30	15	30	35	60	0	35.8%
Machinists and machining and tooling inspectors	1180	80	90	180	250	140	210	135	75	20	19.5%
Tool and die makers	1670	105	110	325	270	170	320	175	60	85	19.2%
Sheet metal workers	125	0	0	0	20	0	20	30	0	0	24.0%
Welders and related machine operators	840	180	140	115	115	100	40	90	45	20	18.5%
Motor vehicle assembling supervisors	510	0	70	35	45	155	60	90	25	20	26.5%
Metalworking and forging machine operators	420	30	40	35	75	35	35	120	0	0	28.6%
Machining tool operators	315	30	30	55	40	35	65	45	20	0	20.6%
Motor vehicle assemblers, inspectors and testers	6890	590	220	430	1140	1290	1465	885	630	160	24.3%

Source: Statistics Canada, 2011 National Household Survey

Emerging Technology & Trends

The changes and developments in the sector are being driven by light weighting and ultimately alternative renewable fuel sources.

The impact of technology in the workplace is causing employers to embrace new processes and ideas on managing their workforce, increasing the need for young and fresh approaches to old situations.

Additive Manufacturing (3D)

3D printing or additive manufacturing (AM), refers to any of the various processes for printing a three-dimensional object. Primarily, additive processes are used, in which successive layers of material are laid down under computer control. These objects can be of almost any shape or geometry, and are produced from a 3D model or other electronic data source.

Today this process has accelerated to include “printing” 3 dimensional parts using computer programs and different materials such as paper, bio tissue, plastic and metals. Several different 3D printing processes have been invented since the late 1970s. The printers were originally large, expensive, and highly limited in what they could produce.

In Windsor-Essex, a number of innovative companies are exploring the various uses of 3D printing in their manufacturing processes. The expanding technology may require additional skills development and training opportunities for those who are interested in working with these methods.

Flexible Production & Automation

Automation or automatic control, is the use of various control systems for operating equipment.

While one of the advantages to automation is that it may reduce labour costs, there is a still a need to have trained and skilled individuals to program, repair and maintain the robotics and other systems of automation. Automation was introduced in the 1930s, and has rapidly advanced with the implementation of new technologies.

Automation has also increased worker safety as in some circumstances; the automation has removed the need for repetitive and strenuous work.

Collaborative Robots that Mimic Human Movement & Fluidity

A robot is an automatic mechanical device. Robotics is one of the cross-sections between Information Technology and manufacturing. Robots are controlled by computer programs that require the inputting of information by a programmer or controller.

Windsor-Essex companies are innovating with robotics. Local companies are looking for individuals with an understanding of both the information technology component of robotics as well as knowledge or experience with manufacturing processes.

Smart Cars? Integration of Software in Vehicles and Automotive Parts

The use of software and electronics in vehicle parts is not new. Diagnostic software has been incorporated into powertrain parts for some time. The recent trend is the marrying of typical personal software into vehicle features and options; automatic park assist, backup sensors, automatic door opening technology, the software integration between personal devices and programmable features for comfort and positioning.

Although outside of the scope of light weighting vehicles, it is a natural innovation occurring as the boundaries between user preference and machinery operation. Through statistical analysis and consultation, Workforce WindsorEssex identified that the occupations that are in demand in the Information, Communication, and Technology sector have applicability to the automotive sector as well. Additionally, these careers will be tied to different aspects of the future of automotive parts and manufacturing as software programming and coding skills impact an automated work environment and smart technology inside of passenger vehicles.

Alternative Materials

The pursuit of alternative materials is not new to the industry. For example, Powertrain and vehicle frame manufacture being phased from steel and cast iron to aluminum and alloy blends; metal structural parts being replaced by plastics and reinforced fiber materials. The difference today is the innovation in industry being the causal effect of not only cost and raw material availability but also of rising fuel prices and the push for more renewable sources of raw products that are not only responsible and sustainable but biodegradable and environmentally responsible.

Alternative & Renewable Fuel Source

Gasoline and diesel have long been the predominant vehicle fuels in the North America, but currently, concerns ranging from greenhouse gas emissions to energy security are spawning new interests in developing sources of energy for vehicles. Fuels such as natural gas, propane, alcohol, and electricity can also power are examples. These fuels are attractive because of their potential to offer a clean-burning, domestically-produced alternative to imported petroleum.

Electric cars, hydrogen cell, battery, solar power operation are becoming popular technologies. Innovation and research projects at major universities, research centers, and vehicle manufacturers are investing into further developing these technologies. One of the challenges identified with this type of innovation is the cost and expense of these alternatives and the availability for mass consumption. In addition, electric vehicles require infrastructure investment from governments

and other stakeholders to include recharging stations and highway restructuring to accommodate this as a modern method of vehicle transit.

For the purposes of this project, we are only focusing on this as an emerging technology for skill development requirements.

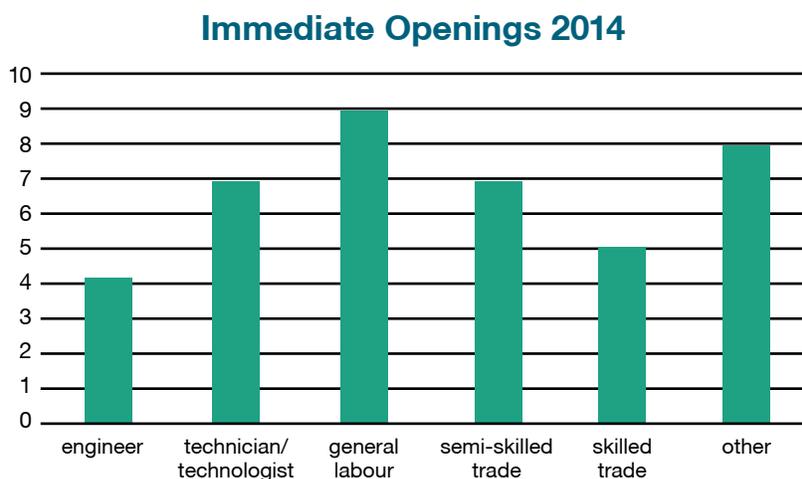
The Common Link to Skill Development

As a reaction to the economic landscape, the Provincial and Federal governments continue to provide funding for innovation, in concert with research and development. Additionally, there continues to be funds for up-skilling our current workforce and for providing opportunities for college and university.

What do these emerging technologies have to do with current skill vacancies and the future of innovation in the automotive sector? They all require science, technology, engineering, and math skills.

The emerging technologies will have an impact on the research and development of products and processes as well as the installation, service and maintenance components, therefore requiring continuous developing of the current and future workforce.

Through consultations with over 25 employers in the automotive sector, the occupations in the chart below were identified to be immediately available.



Examples of Occupations that were identified within each categorization include:

Engineering

design engineering, controls engineering, quality engineering, mechanical engineering, manufacturing engineering, electrical engineering

Engineering Technologist

Semi-Skilled

machine operator, plc operator, cnc operator

Skilled Trades

electricians, mold maker, tool maker, welder

What You Need to Know

The manufacturing industry in Windsor-Essex is in transition. The occurrence of 'lean thinking', which is to identify and implement efficiencies and a push to innovate will continue to impact the landscape of automotive manufacturers. In addition, organizations are looking to other sectors, like Aerospace to inspire their innovation and to benchmark new ways to explore better technology and processes. The manufacturing industry has many opportunities and you could be part of an exciting future where today's dreams and ideas are being developed into the products of the future.

Workforce WindsorEssex asked employers, educators, and stakeholders what people should be aware of in the sector. The following information is a summary for those who are interested in exploring a career in the automotive sector.

Are You a Student? Get Involved!

If you are considering a career in automotive manufacturing, employers in the sector strongly suggest staying connected to the local industry. Look for ways to tour businesses and facilities that can answer your questions about these careers. Work with your teachers, your school board, and adults you know who can help make introductions to people who can be mentors inside of industry. Visit Centers of Excellence, which are, research and innovation organizations funded by the provincial government to be inspired by what you see. Think beyond where we are today.

You are in the perfect place to explore an exciting career in the automotive industry. Windsor-Essex is in the heart of its innovation and has great post-secondary institutions that will give you a sneak peak at what skills and classes may look like.

In the southwestern Ontario and southeastern Michigan region, we have the **North American International Auto Show** and the **BIG M** Manufacturing Convergence as two of the largest showcases dedicated to manufacturing. Locally, there are several industry organizations that are looking for young people to join their membership; some at a very reasonable discount, and others for free. Some examples of associations include:

- **Automotive Parts Manufacturers Association**
- **Canadian Tooling & Machining Association**
- **Canadian Association of Mouldmakers**
- **Automotive Industries Association of Canada**
- **Canadian Vehicle Manufacturers Association**



If you are interested in Robotics, **WEtech Alliance** is spearheading the expansion of FIRST Robotics in Windsor and Essex County. FIRST (For Inspiration and Recognition of Science and Technology) is an international robotics competition at the high school and grade school levels that promotes an interest among young people in science, technology, engineering, and mathematics.

<http://www.wetech-alliance.com/first-robotics/>

Other Suggestions from Employers

Brush up on your interpersonal skills! Today's employers expect to treat you like an everyday employee. The list below includes skills that local employers highlighted as being important in a co-op placement, internship, apprenticeship and part-time and full-time jobs:

- Be responsible and dependable.
- Think of potential solutions to problems or challenges that you encounter.
- Take Initiative.
- Don't be afraid to make suggestions on how to improve things. Sometimes, being in the same environment for a long period of time makes it difficult to look at situations differently. This is where you have an advantage, if you offer suggestions in a respectful way.
- Minimize the use of cell phones and social media at the workplace unless approved by your employer.
- Ask questions. Don't be afraid to ask a lot of questions about your performance and what you need to continue to know to be successful on the job. Learn to embrace feedback.

Are You an Educator?

The world of manufacturing is on the lookout for talent.

As the sector grows and changes, it will need bright brains at every level to keep manufacturing at the forefront of the economy. Employers identified that often there is a misconception of the sector and the workplace environment. By showcasing the sector to students, you can help overcome that myth. There are many videos available online to showcase the sector. Please see the list of Resources at the end of this report.

Modern manufacturing is now a global enterprise competing in innovation, creativity, and smart thinking. Local manufacturers aim to attract the brightest and best talent into manufacturing. You can help. By changing these perceptions and showcasing the sector as an exciting and rewarding career path for young people through hands-on, practical events like **MFG DAY** and enterprise challenges like that being offered through WETECH Alliance FIRST Robotics, you can connect young people to local manufacturers.

How? Build connections through local industry associations and partner with them where possible. With manufacturing being hands-on, creative, and fun, connecting young people to local manufacturers to show the types of career paths available within modern manufacturing may be one way to think beyond the classroom and leverage some of the burden you face with budget, time, and expertise.

Board programs like the Ontario Youth Apprenticeship Program, Specialist High Skills Major, and industry Coop programs help young people get a sense of the work environment and skills required for a career in manufacturing. Many local associations and industry groups offer training and skill development opportunities for members. This may be an avenue to consider when designing and supplementing curriculum.

In addition, employer feedback suggests there is a need for interpersonal skill development for youth to be successful in the work environment; it's not all about technical aptitude or skill. Looking for ways to leverage a community partner or build these skills into an academic portfolio may also help to continue to reinforce the importance of this for students.

Are You an Employer?

Even with unemployment hovering around 9% (as of October 2014), companies are stating that they can't find skilled workers, and filling a job can take months of hunting, as evidenced by the employer feedback received during the discussions with industry. If you are an employer that is facing challenges finding talent, you may want to consider some of these ideas to help improve the situation.

Partner with school boards, high schools, colleges and universities. Aside from the funding available for using these institutions as support for innovation and problem solving, there are also opportunities for you to continue to promote a career in your industry.

Work with education providers. This may be a college, university, a trade school, or an industry association. Local community colleges, especially in Ontario, are good partners with employers by tailoring very applied course work to the specific needs of the employer. Candidates qualify to be hired once they complete the courses—which they pay for themselves, at least in part. For instance, a manufacturer might require that prospective job candidates first pass a course on quality control or using certain machine tools.

When bringing young people into your building, consider this may be their first employment opportunity and it might be a bit overwhelming. Consider ensuring you have internal 'mentors' that they can shadow, or build a relationship with. This will provide for a smoother transition.

In the case of needing immediate talent, consider working with employment groups and service providers. These organizations are able to connect you with the available workforce including youth, newcomers, older workers, etc.

Promising Skills and Careers

"There's a big demand for engineers who know power electronics, as well as for those in disciplines such as software and computer science, not traditionally part of the automotive industry," says IEEE Fellow David Munson, dean of engineering at the University of Michigan, in Ann Arbor. "This might be the most interesting time the automotive industry has ever seen." <http://theinstitute.ieee.org/career-and-education/career-guidance/how-to-get-hired-in-the-automotive-industry>

The rapid development of such vehicular technologies as advanced-safety, autonomous-driving, and infotainment systems, as well as electrified powertrains, next-generation hybrid and electric cars, and advanced batteries means that automakers and their suppliers need lots of talented employees.

Academic & Applied Programs for Skill Development

Below are some of the local specific areas of study that can help to prepare the future workforce for transforming technologies and skills demands.

University of Windsor (www.uwindsor.ca)

All programs require a minimum admission average of 70%. This average may be higher, depending on the number of applicants. A second average is considered for students applying for Engineering Programs of average of all math and science courses except biology (74%).

Engineering: electrical, mechanical, chemical

Electrical and Computer Engineering: Mechanical, Automotive & Materials Engineering (Aerospace, Automotive, Environmental & Materials options)

Industrial and Manufacturing Systems Engineering

St Clair College of Applied Arts and Technology (www.stclaircollege.ca)

Admission requirements for programs at St. Clair College range depending on the nature of the course of study. Most programs require a minimum Ontario Secondary School Diploma and a concentration or good marks in Math, Physics, Chemistry and Applied Science. For Pre-Apprentice and Apprentice programs, the admission requirements are dependent on the program.

Mechanical Engineering Technician: Industrial

Mechanical Engineering Technology: Automotive Product Design

Electromechanical Engineering Technician: Robotics

Electrical Engineering Technician

Computer Science or Computer Programming or Information Technology

Software and mobile developers

Electronics Engineering Technology: Industrial Automation.

Millwright

Machinist

Supply Chain and Logistics Program

International Trade

Truck and Coach Techniques

Motive Power Technician

Diesel Mechanic: Apprenticeship

Auto Service Mechanic: Apprenticeship

Pre-Apprenticeship Programs

Trade Union and Apprenticeship

“An apprenticeship is a training agreement between a person who wants to learn a skill and an employer who needs a skilled worker. To become a certified tradesperson it requires a combination of on-the-job and in-school training. On the job, apprentices learn skills and competencies by completing various operations associated with the trade under the supervision of a qualified tradesperson. This process takes between 2 to 5 years, depending on the occupation, but the apprentice is “earning while learning.”⁸

Skilled Trades: 5 Steps of the Apprenticeship Process

The process is the same regardless of the trade. Each trade is unique and the differences are in the length of time required to complete an apprenticeship, the legislation that regulates them, financial incentives and the number and length of the in-school training sessions.

1. **RESEARCH**
2. **EDUCATION**
3. **EMPLOYMENT**
4. **TRAINING**
5. **CERTIFICATION**

8 St. Clair College, “Apprenticeship”, Online. <http://www.stclaircollege.ca/programs/postsec/apprenticeship/>

More information on the details of these steps can be found at <http://www.tradeability.ca/> . The potential 'in-demand' trades for the next 5 – 10 years will include the following for the manufacturing sector:

Die Designer

Draftsperson: Plastic Mould Design

Draftsperson: Tool and Die Design

Electrical Control (Machine) Builder

General Machinist

Instrumentation and Control Technician

Industrial Mechanic Millwright

Industrial Electrician

Machine Tool Builder and Integrator

Metal Fabricator (Fitter)

Micro Electronics Manufacturer

Mould Designer

Mould Maker

Mould or Die Finisher

Tool / Tooling Maker

Welder

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Additional Sources

These sources below provide additional information on the technologies discussed throughout the report. These sources also highlight local employers who are using these innovative technologies.

Sources 3D technology

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Appendix A

List of Occupation Classifications that were employed within the motor vehicle manufacturing, motor vehicle body and trailer manufacturing and motor vehicle parts manufacturing industries as of the 2011 National Household Survey.

Legislators and senior management
Administrative services managers
Managers in engineering, architecture, science and information systems
Corporate sales managers
Retail and wholesale trade managers
Managers in food service and accommodation
Managers in manufacturing and utilities
Auditors, accountants and investment professionals
Human resources and business service professionals
Administrative and regulatory occupations
General office workers
Financial, insurance and related administrative support workers
Supply chain logistics, tracking and scheduling co-ordination occupations
Civil, mechanical, electrical and chemical engineers
Other engineers
Architects, urban planners and land surveyors
Computer and information systems professionals
Technical occupations in civil, mechanical and industrial engineering
Technical occupations in electronics and electrical engineering
Technical occupations in computer and information systems
Security guards and related security service occupations
Cleaners
Machining, metal forming, shaping and erecting trades
Electrical trades and electrical power line and telecommunications workers
Plumbers, pipefitters and gas fitters
Machinery and transportation equipment mechanics (except motor vehicle)
Automotive service technicians
Longshore workers and material handlers
Motor vehicle and transit drivers
Supervisors, assembly and fabrication
Machine operators and related workers in mineral & metal products processing & manufacturing
Mechanical, electrical and electronics assemblers
Other assembly and related occupations
Labourers in processing, manufacturing and utilities