

A Spotlight on Skills, Talent & Workforce Development: EV Automotive Repair, Aftermarket and Infrastructure for Electrification Ontario Centre of Innovation – Ontario Vehicle Innovation Network (OVIN) October 2023



EV CHARGING

CAR CHARGING INFORMATION

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Acronyms and Glossary of Terms



Acronyms		Glossary of Terms	
AutoCAD	Automated computer-aided design	Carousels	Devices used to lift and rotate vehicles in automotive repair and maintenance work.
CASE	Computer assisted software		
CIP	Classification of Instructional Programs		
DC	Direct current	EV Aftermarket	Market for products and services related to the maintenance and repair of electric vehicles, including parts, accessories, and specialized tools.
EDI	Equity, diversity and inclusion		
EV	Electric vehicle	EV Infrastructure	Network of charging stations, power grids, and other necessary equipment and infrastructure to support the charging and operation of electric vehicles. Evaluation and planning of the power grid infrastructure necessary to support the widespread adoption of electric vehicles, including the installation of charging stations and related infrastructure.
GDP	Gross domestic product		
MEDJCT	Ontario Ministry of Economic Development, Job Creation and Trade		
MLITSD	Ministry of Labour, Immigration, Training and Skills Development	Grid planning/assessment	
МТО	Ministry of Transportation		
NAICS	North American Industry Classification System		
NOC	National Occupational Classification	Skilled labour	Workers with specialized skills in the labour market.
OCI	Ontario Centre of Innovation		
OEB	Ontario Electric Board	Smart mobility	Integration of transportation technology to improve efficiency and safety.
OVIN	Ontario Vehicle Innovation Network		
SQL	Structured Query Language		



Introduction



In 2019, the Government of Canada announced a mandatory target for new passenger vehicle sales to be **zero-emission by 2035**. As a result, Ontario's automotive and mobility sector is undergoing a **major electrification transformation**. To ensure the successful adoption of electrification in the automotive and mobility sector, it is crucial to build electric vehicle (EV) infrastructure and develop a network of aftermarket and repair competencies. Various industry leaders have already begun making significant advancements.¹

EV Infrastructure

The electrification transformation has inspired a range of **investments** and projects from local, national, and global companies. Ivy Charging Network, in partnership with Canadian Tire, Ontario's Ministry of Transportation, and ONroute, is working to install 69 fast chargers across all ONroute locations.²

In 2022, Ontario's Alectra Utilities announced that they received funding from Natural Resources **Canada's Zero-Emissions Vehicle Infrastructure Program** to install public charging stations aimed at improving access for highway EV drivers in rural and underserviced areas.³

More recently, the Ontario Electricity Board (OEB) is investigating the feasibility and implementation plan for **ultra-low overnight electricity usage rates**.

This initiative could potentially make EV adoption more affordable while optimizing Ontario's **grid efficiency** due to surplus power available at night (off-peak hours). Electrification transformation has inspired various investments and projects from local, national and global companies.⁴

EV Aftermarket and Repair

The growing adoption of clean technologies in the automotive and mobility sector raises important questions about who will service these vehicles and what parts, accessories, or components are required to do so. To accelerate development in the EV aftermarket, the Government of Ontario has launched the **Ontario Automotive Modernization Program**. This initiative supports small- and medium-sized automotive parts suppliers in adopting the tools and technologies necessary to manufacture components for next-generation vehicles.⁵

Moreover, several key industry players are working to develop a **skilled repair technician workforce** in Ontario by creating standardized EV training curricula at the postsecondary level or offering industry-recognized certifications for EV skills acquisition. Additionally, the **Ontario Skills Development Fund** is supporting a partnership between the Automotive Industries Association of Canada (AIA Canada), the Government of Ontario, and St. Lawrence College to implement an innovative automotive aftermarket industry training project.⁶



Executive Summary



This spotlight highlights the following:

Ontario's EV Infrastructure, Aftermarket and Repair Sector

EV infrastructure, aftermarket and repair are the fourth and fifth stages of the automotive Electrification value chain and include the installation and maintenance of specialized infrastructure geared towards EVs, including grid planning/assessment, charging stations as well as servicing for EVs after they have been sold to the final user. Below is an illustration covering various stages of the electrification value chain:



This section provides an overview of Ontario's infrastructure developments for widescale EV adoption and features the impact of recent technological developments on labour force requirements and skills development needs in the short- and long-term.

Labour Market and Emerging Skills

This section highlights the required skills and key occupations with the largest shares of employment in the sector. It also presents a provincial labor market outlook for the next 10 years, identifying occupational gaps and emerging skills.

• Top occupational employment shares include automotive service technicians and electrical trades.

- **Current skill requirements** include various digital technologies required for EV infrastructure development.
- High occupational gap is expected for retail occupations and automotive mechanical installers.

Talent and Workforce Development

This section highlights the workforce education profile indicating a strong focus on qualifications in mechanic and repair technologies and engineering. This is complemented by an overview of Ontario-based training and development programs tailored to the emerging skills and upskilling requirements essential to the EV infrastructure, aftermarket and repair sector.

Equity, Diversity and Inclusion

This section explores current trends in the representation of minority groups in the EV infrastructure, aftermarket and repair employment in Ontario. It further examines national and global diversity and inclusion initiatives in the sector, highlighting priorities to promote employment access for underrepresented groups.

This spotlight serves as an introductory informational booklet and is part of a series covering various segments of the automotive and mobility sector. For more information on the highlighted knowledge, tools, skills, and abilities, please refer to the cited references and other relevant sources, including other OVIN publications.







Ontario's EV Infrastructure, Aftermarket and Repair Sector at a Glance

Ontario is uniquely positioned to build electric vehicle (EV) infrastructure, and a network of aftermarket and repair competencies.

Ontario is pursuing a well-rounded and targeted approach to build the EV infrastructure and service workforce to keep up with the adoption of clean technologies in the automotive and mobility sector.⁷ In 2022, the Government of Ontario invested **\$91 million** towards public charging infrastructure. Today, there are **2,900 charging stations** with over **5,000 charging ports** in Ontario.⁸

Types of EV Chargers⁹

- Level 1 charging: slowest level of charging (110 Volts/15 Amps)
- Level 2 charging: slightly faster than Level 1 chargers (240 Volts/30 Amps)
- Level 3 charging/direct current (DC): fastest level of charging (400 Volts/100 Amps)

The availability of skilled labour workforce supports Ontario's EV infrastructure, aftermarket and repair sector.

As of 2021, 97,715 workers are employed in Ontario's EV infrastructure, aftermarket and repair sector¹⁰

Top in-demand occupations

- Mathematicians, statisticians, actuaries and data scientists
- Retail and wholesale trade managersTransport equipment operators, utility
- maintenance and maintenance workers
 Supply chain logistics, tracking and scheduling coordination occupations

Top skills required in EV Infrastructure Development

- Java
- SQL (Structured Query Language)
- Cloud Computing
- Atlassian JIRA
- AutoCAD

EDI Snapshot¹¹

Women representation



Indigenous representation

3.1%

Visible Minority representation

24.7%



Looking ahead, Ontario's EV infrastructure, aftermarket and repair labour force requirements point to greater digitalization and technical skills.

Reskilling

may help workers adapt to increased digitalization

Expected in-demand occupations

- Storekeepers and parts persons
- Other automotive mechanical installers and servicers
- Retail salespersons

Expected Skill Gaps

- Maintenance software
- IBM Maximo
- Inventory control software
- Spreadsheet applications
- Computer assisted software engineering



Current Labour Market Insights

Top 10 Occupations in EV Infrastructure, Aftermarket and Repair¹²

- The figure below presents the top 10 occupations based on employment in the EV infrastructure, aftermarket and repair sector, encompassing electric power generation, transmission and distribution and automotive repair/maintenance industries.
- Besides automotive service technicians roles, the top 10 occupations in these group of industries include technical occupations, such as:
 - Electronics and electrical engineering (e.g., technicians and mechanics involved in repair, maintenance, calibration, and installation of electronic parts)
 - Utilities equipment operators and controllers (e.g., power engineers, power systems operators, etc.)

Top Skill Requirements¹³

- Job postings (2018-2022) show that technical skills presented in the chart below are high in demand in the labour market. Qualified workers are also expected to have a strong command on general skills which are effective competencies and transferable across roles.
- Notably, various technologies such as cloud computing, AutoCAD, and Atlassian JIRA (used for bug tracking and agile project management) are often requested by employers looking for qualified talent to develop the required EV infrastructure.
- Additionally, proficiency in tools essential in automotive repair and maintenance work (e.g., industrial fans, carousels, power tools, etc.) is also sought after.





Ontario 🕅

Administrative, property and payroll officers 97,715 2% **Employed in EV** Office support and court services occupations 2% Infrastructure. Aftermarket and Civil and mechanical engineers 2% **Repair in Ontario** Transport equipment operators, utility maintenance and related as of 2021 2% maintenance workers Technical occupations in electronics and electrical engineering 2% Customer and information services representatives 3% Utilities equipment operators and controllers 3% Cleaners Technical electrical trades and electrical power line and 5% telecommunications workers Automotive service technicians 35% 25% 15% 20% 30% 35% 40%

Note: The occupations in this chart are the top ten occupations with the highest employment as a share of total employment in EV Automotive Repair, Aftermarket and Infrastructure (NAICS 2211 and 8111).



Skills Outlook and Expected Gaps

Labour Market Gap Outlook¹⁴

- The labour market outlook for 2023-32 time period is developed based on projected growth in:
 - **Demand:** sector expansion driven by economic growth, replacement demand arising from retirements in the sector, and workers transitioning to other sectors; and
 - Supply: new workforce entrants, including new graduates and trainees, immigrants, and workers from related sectors.

Expected Labour Market Gaps by Occupation Category

Expected labour market gaps are determined based on the difference in future labour demand and supply.

Moderate

High and moderate labour force gaps indicate that projected total demand for workers exceeds availability of workers in the labour market, suggesting potential challenges in finding qualified workers. High gaps are more acute and prominent for retail occupations, and given high level of employment and expected growth over the next decade, this is a high priority for talent attraction.

Low

Low labour force gaps indicate sufficient availability of workers in the labour market compared to what employers demand. Low gaps are prominent for select trades, such as power engineers and power systems operators.



Expected Skills Gap, 2023-32¹⁵

- Based on occupational gaps, skills gap is derived as the difference between skills demand and supply projections. This helps identify emerging technical skills for the next ten years (2023-32).
- Presented below are standardized scores to illustrate skills where highest gaps are expected, such as maintenance software, IBM Maximo, etc., indicating potential need for skill development.



Note: The size of the bubble indicates the relative magnitude of the expected occupational gap for each occupation. The employment numbers denote employment for a combination of industries and occupations relevant to the sector.

Note: Please see Methodology and Data Limitations section on page 13 for further detail on the skills gap analysis.



Ontario 🕅





Training and Education Requirements and Programs

Workforce Education Profile and Requirements¹⁶

- The most common field of study among workers in the EV infrastructure, aftermarket and repair sector is mechanic and repair technologies and technicians programs, which account for 45% of all workers who completed a study program.
- Additionally, a combined 25% of employees studied engineering and engineering technologies and related fields.
- Further, 8% of workers in the sector trained in construction trades, while 6% studied business or other related fields.



Note: Engineering comprises of instructional programs that prepare individuals to apply mathematical and scientific principles to the solution of practical problems. Engineering technologies/technicians comprises of instructional programs that prepare individuals to apply basic engineering principles and technical skills in support of engineering and related projects.

Talent and Workforce Development Programs

Below is a selection of programs, trainings and certificates across Canada for current and aspiring workers in the EV infrastructure, aftermarket and repair sector in Ontario.

ST. CLAIR



- Based in Ontario
- Electric Vehicle Technician Program
- Training on diagnosing, servicing and repairing high voltage EVs



- Based in Ontario Electric Drive Vehicle Technician
- Training on EV powertrains, energy storage systems, electric machines, and power modules

Electric Vehicle Infrastructure

Training on installation and

access.

brilliant as you are

Electric Vehicle Mechanics

Maintenance and repair of

electrical and electromechanical

brillant comme vous l'êtes

Training Program

maintenance of EV

Based in Ouebec

systems.



- Based in Ontario
- EV repair and maintenance program
- Certification on electric and plug-in hybrid vehicle repair and maintenance



Electrical Joint Training Committee

- Based in Quebec
- Electric Vehicle Infrastructure
 Training Program
- Installation and maintenance of the EV charging infrastructure



British Columbia Institute of Technology

- Based in British Columbia
- EV Maintenance Training
- Training to diagnose and repair zero-emission vehicles



- CONTARIO CANADA

 Based in Ontario

 Based in Ontario
- EV Upskill Electric Vehicle Training Training to develop skills to enter the EV industry



Nova Scotia Community College

 Offered online
 Based in Nova Scotia
 Electric Vehicle Safe Service
 Safety standards and best industry practices for EV





Equity, Diversity, and Inclusion

Current Minority Groups Representation in EV Infrastructure, Aftermarket and Repair¹⁷

Based on 2021 employment, women and Indigenous groups are underrepresented in Ontario's EV Infrastructure, Aftermarket and Repair sector.



Current Initiatives Across Canada

Public organizations and private companies have developed various initiatives to promote equity, diversity and inclusion (EDI) in the Canadian EV repair and infrastructure sector.





Association of Electric Vehicles Quebec hosts a program called Jumelage which is a buddy system between an experienced ÉV professional and interested knowledge seekers such that the information is accessible to all regardless of race or gender.



Electricity Canada hosts an event, "Women in Electricity Award" that recognizes an individual for their extraordinary resolve in advancing women in organizational structures, company processes, and outcomes.





Future Skills

Women in Renewable Energy's mission is to advance the role of recognition of women and other under-represented/minority groups in the energy sector through industry and

government partnerships, networking, programs, etc.

Organizations worldwide are promoting EDI in EV Infrastructure, Aftermarket and Repair





Global Women's Network for the Energy Transition empowers women in energy through networking, advocacy, training, and mentoring, to help them succeed in the EV industry.

Blacks in Electric Vehicle Infrastructure strives to ensure that Black people have a seat at the EV table and a fair opportunity to contribute to initiatives and innovation.

N ENERGY PARTNE

DUNAMIS Clean Energy Partners is the first Black-woman-owned charging station company in the world that focuses on racial equity and justice as part of its operations.

Stakeholders in the sector are improving EDI by¹⁸



Companies in the industry seek

to to build a diverse workforce.

by promoting internal policies

that make it possible for current

and potential employees to feel

included regardless of their race.

Trainings to

Marginalized Communities Companies work on improving

employment opportunities for low-income, vulnerable and marginalized groups through access to in-demand skills training.

Advocating for Equal Opportunity Policies

A key for EDI promotion is to create consciousness and advocate to local and national authorities for legislature and policy to allow for equitable advancement opportunities in the EV sector.

Opportunities to increase women's representation in EV Automotive Repair, Aftermarket and Infrastructure include¹⁹



Networkina **Events for** Women

Stakeholders can organize

networking events for women to

share, exchange, and learn from

each other's experiences.



Training Programs Companies can set up female-

led training initiatives that will

serve as role models for other

women.



Promoting Women in Leadership Positions

Companies in the sector can actively work to increase women's representation in leadership positions at all levels.



About OVIN



Leading Ontario's Automotive and Mobility Transformation

The automotive industry is undergoing a significant shift, with technological advances and evolving mobility preferences redefining its future.

OVIN, led by the Ontario Centre of Innovation (OCI), is supported by the Government of Ontario's Ministry of Economic Development, Job Creation and Trade (MEDJCT), Ministry of Labour, Immigration, Training and Skills Development (MLITSD) and Ministry of Transportation (MTO). Through OVIN, Ontario is at the forefront of the automotive and mobility sectoral transformation. OVIN capitalizes on the economic potential of advanced automotive technologies and smart mobility solutions such as connected and autonomous vehicles, and electric and low-carbon vehicle technologies, while enabling the province's transportation and infrastructure networks to plan for and adapt to this evolution.

OVIN is accelerating the development and commercialization of next generation electric, connected and autonomous vehicle and mobility technologies and supporting Ontario's role as the manufacturing hub of Canada.

OVIN has five main objectives:

1. Foster the commercialization of Ontario-made advanced automotive technologies and smart mobility solutions

2. Showcase the Province of Ontario as the leader in the development, testing, piloting and adoption of the latest transportation and infrastructure technologies

3. Drive innovation and collaboration among stakeholders at the convergence of automotive and technology

4. Leverage and retain Ontario's highly skilled talent, and prepare Ontario's workforce for jobs of the future in the automotive and mobility sectors

5. Harness the Province of Ontario's regional strengths and capabilities, and bridge its automotive and technology clusters to promote the development of EV and power train technologies in Ontario



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Methodology and Data Limitations



Methodology

An overview of the methodology of the analysis is presented below:

- Skill gaps were defined based on the average occurrence rate of a skill in job posting related to the segment and the average occurrence rate of the same skill in relevant job seeker profiles. Occurrence rate is the frequency or percentage of job postings that mention a given skill, tool, or technology, in relevant occupations. Skill gaps where demand exceeded supply are included in the report.
- Occupational demand is projected based on industry's forecasted growth as per Oxford Economics, in combination with expected changes in the demand for workers, including annual change in employment by occupation and replacement demand. Replacement demand is based on estimated rates of exit from the labour force due to retirement, emigration or death. Exit rates are based on the Canadian Occupational Projection System (COPS) data.
- Occupational supply is projected based on three distinct sources: school leavers (i.e. postsecondary graduates and apprenticeship completions), immigrants, and job changers (i.e. individuals currently in the workforce who may enter the sector).
- Occupational labour gaps were determined subtracting total projected supply from total projected demand across all forecast years (2023-2032). The skills outlook was based on occupational projections for a common set of skills available in both job postings (demand) and job seeker profiles (supply).
- The degrees required by employers in EV infrastructure, aftermarket and repair are reflected in the most common fields of study for workers currently employed in the segment. These fields are identified by triangulating field of study (CIP), occupation (NOC), and industry (NAICS) data.

Data Limitations

Identified limitations with the datasets and approach used in the analysis include:

- Skills data were collected from Vicinity Jobs, a labour market analytics firm, at the level of occupations (4-digit NOC) and grouped into occupation categories based on the similarity of their roles within each segment of the automotive and mobility sector, including information regarding the education level and workforce characteristics (e.g., skills, knowledge, tools & technology) required in postings by occupation.
- The analysis of skills was limited by the availability and completeness of data. There were gaps in terms of job posting and job seeker profiles in Vicinity Jobs data, which means that the estimations of skills demand, supply, and gap should be considered as a ranking rather than a definitive estimation.
- Future skill insights were limited by the skills present in current state data from job posting and job seeker profiles, meaning "new" skills that are not related to occupations in the present could not be identified.
- The data used for the analysis of representation of women, visible minorities, and Indigenous groups in Ontario's employment by industry and by occupation is sourced from Statistics Canada's latest Census from 2021. Data for non-binary gender groups are not available at the level of granularity in this analysis.



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Disclaimer

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