Career Opportunities in Sustainable Emerging Markets

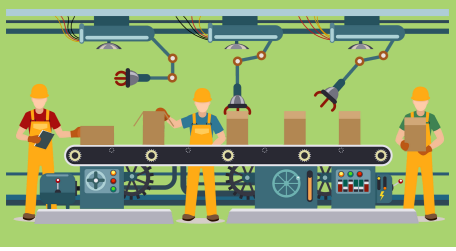
FOCAL Initiative

Electric Vehicle Battery Manufacturing

The shift from internal combustion engine vehicles to electric vehicles (EVs) is an key part of Canada's sustainability strategy. Transportation accounts for 25% of Canada's greenhouse gas emissions, with almost half of that share of emissions coming from light-duty cars and trucks. Current mandates will limit the sale of new light-duty vehicles from 2035 and beyond to fully EVs (also known as battery electric vehicles). There are also significant incentives for consumers to own EVs, including provincial and federal rebates. Growing EV sales will translate to a sustained period of growth for battery manufacturing over the upcoming years. Federal and provincial governments have pledged to support EV battery manufacturing by providing over $37 billion to major manufacturers, which will help to establish a strong EV supply chain within the country.

Electric Vehicle Battery Manufacturing Key Industries

Electrical Equipment Manufacturing



Battery Manufacturing

Motor Vehicle Parts Manufacturing

Several unique players are in the EV battery manufacturing space. Motor vehicle and parts manufacturers are now investing to establish their own battery production partnership and capabilities. Advanced electrical and electronic manufacturers have leveraged their resources and knowledge to diversify into manufacturing batteries for electric vehicles. There has also been an emergence of businesses primarily engaged in EV battery manufacturing or aid in design services, which are business-to-business entities partnering with motor vehicle manufacturers that lack battery production capabilities to deploy or develop technology.

Methodology

NAICS data were collected for industries involved in the development, design, and manufacturing of EV batteries within the market. Using census data, the NAICS codes were cross-referenced with NOCs data to determine the jobs with largest employment within these industries. Using public job posting databases and company career pages, skills, education and employment requirements were collected on occupations that were highlighted, and similar professions which were not listed under the title of a specific NOC code. The common skills and requirements were cumulated for occupations and jobs within EV battery manufacturing.

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Opportunities in EV Infrastructure Development and Maintenance

Opportunities exist within the market for EV Battery Manufacturing for workers of all skill levels, ranging from entry-level workers to professionals with degrees. Below are some occupations and jobs that play a critical role in this developing market:

Production Workers

Battery Assembly Technicians

Minimum Education: High School Diploma or equivalent.

Additional Certification: The position may require some material handling, shipping and handling activities, so a forklift license is an asset.

Training and Other Requirements: Prior experience in manufacturing or working with industrial batteries is an asset.

Key Responsibilities: Battery Assembly Technicians are responsible for overseeing the battery production process. They interact with automated process and perform quality control tasks and equipment calibration to ensure that manufactured batteries conform to specifications.

Desirable Skills and Traits: Monitor equipment in operation and perform simple programming to adjust parameters, inspect completed and work-in process batteries. Communication and teamwork are important assets.

Other Skill Highlights: Measuring device operation, reading technical documents, human machine interface operation, mechanical troubleshooting, hand-eye coordination, physical strength, manual dexterity.

Professional Engineers

EV Battery Software Engineers

Minimum Education: A bachelor's degree or diploma in electrical, mechanical or software engineering, robotics or computer science.

Training and Other Requirements: Prior experience in developing and designing control systems or firmware development and automotive engineering is required.

Additional Certification: Some positions may require licensing with a provincial board of engineers.

Key Responsibilities: Battery software engineers are responsible for programming and designing battery management systems to monitor core functions such as temperature, performance, and create systems for data collection used in performance analysis research to improve technology.

Desirable Skills and Traits: Strong programming and software development (C/C++, CAN software, Python, Matlab) skills. Data management and statistical analysis for quality control and testing. System design in order to model and prototype processes within battery management systems.

Other Skill Highlights: Troubleshooting, strong mathematical reasoning, problem solving and analytical skills. Teamwork, strong communication and administrative reporting are important for working within cross-functional teams.

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Professional Engineers

Battery System Simulation Engineers

Minimum Education: Most positions require a masters or Ph.D. in mechanical engineering, chemistry, applied mathematics or physics, computer engineering or other related fields of engineering.

Additional Certification: Most positions will require registration with a provincial board of engineers.

Training and Experience: Extensive experience with vehicle and engine performance simulation, and system modelling is desirable.

Key Responsibilities: Develop standardized processes, methodologies and simulation models to analyze, test and create predictive models of battery and battery management systems to aid in product development, improvement, and safety.

Desirable Skills and Traits: Programming, statistical, system and simulation modelling, and knowledge in software that assist in performing those tasks (Matlab, Python, Simulink, COMSOL). Knowledge of electrochemistry, physics and physics based modelling and machine learning.

Other Skill Highlights: Mathematic reasoning, problem solving skills, quality control analysis, teamwork, communication skills, design, data management, office suite software, troubleshooting and system evaluation.

Future of Work in EV Infrastructure Development

Battery manufacturing for EVs is a sub-sector poised for large growth over the next decade. Continued efforts by the government to provide support for manufacturers and consumers to manufacture and adopt EVs, and investment to support infrastructure will increase the demand for batteries and other advanced electrical and electronic technologies. According to FOCAL projections, the need for workers and skilled professionals to support EV manufacturing and technology development in Canada can grow significantly by 2040, if Canada is successful in transitioning to EV manufacturing and attracting battery investment.

To learn more about the developments, trends and new technology within Canada's automotive manufacturing and related industries, visit our website at:
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