ELECTRIC VEHICLE CAREER PATHWAYS REPORT

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Electric Vehicle Career Pathways

The EV Career Pathways report provides pathways for those interested in transitioning from traditional manufacturing or **internal combustion engine vehicle (ICE-V)** production jobs to **electric vehicle (EV)** careers with transferable skillsets. With such a strong automotive manufacturing landscape, Windsor-Essex is the ideal region for those currently employed in traditional automotive manufacturing jobs to transition into EV careers of the future.

To provide a comprehensive overview of potential career opportunities within the EV sector, this report will categorize roles into five distinct domains. These categories will serve as groupings to identify and understand various pathways available in Windsor-Essex's burgeoning EV sector. Each category will be accompanied by an overview and definitions to facilitate a clearer understanding of the roles encompassed within them.

The following are the five major categories:

- ## Manufacturing

  EV Manufacturing refers to the process of producing EVs on a large scale, involving the assembly of various components and subsystems to create a fully functional EV.
- ## Maintenance

  EV Maintenance refers to the regular upkeep, servicing, and repairs required to keep EVs in optimal operating condition.
- ## Scientific Research

  EV Scientific Research refers to the systematic investigation and study conducted by scientists, researchers and experts in various fields to advance the knowledge and understanding of EVs.
- ## Design and Development

  EV Design and Development refers to the process of creating and refining EVs.
- ## Infrastructure

  EV Infrastructure refers to the network of charging stations, support systems, and associated technologies that enable the charging and operation of EVs.

Electric Vehicle Career Pathways

Infrastructure

EV infrastructure refers to the network of charging stations, support systems, and associated technologies that enable the charging and operation of EVs. It encompasses the physical charging stations, the electrical grid infrastructure required to supply power to these stations, as the digital systems and software that facilitate charging management and connectivity. The growth of EV infrastructure is crucial for widespread EV adoption, as it mitigates range anxiety and provides convenient charging options for EV owners, supporting a seamless transition to electric mobility. Beyond individual benefits, a comprehensive EV infrastructure aligns with environmental goals, reduces emissions, and positions our region as leaders in the clean energy transition.

The following transitions to EV careers in infrastructure can be made by those with automotive knowledge and experience. Each of the below career pathways represents a classic manufacturing or an ICE-V production job transitioning (➤) to multiple potential EV careers with transferable skillsets.

Electrical Engineer – 2133 ➤ EV Charging Infrastructure Engineer, Battery Energy Storage Systems Engineer, Smart Grid Engineer

ICE-V Job Description

Electrical Engineer:

- Electrical Engineers involved in infrastructure for ICE-Vs work on electrical systems that make cars run smoothly. They design and improve the wiring, circuits, and electronic parts in vehicles. These engineers also create systems that control infrastructure like traffic lights, sensors, and other electrical components.

Transferable Skills

- **EV Charging Infrastructure Engineer:** Electrical system design, power distribution knowledge, circuit analysis expertise, equipment installation experience, familiarity with electrical regulations and standards, adaptability, problem-solving skills, teamwork, communication abilities, project management experience, and an understanding of infrastructure development processes.
- **Battery Energy Storage Systems Engineer:** Electrical system design, power distribution knowledge, circuit analysis expertise, equipment installation experience, familiarity with electrical regulations and standards, adaptability, problem-solving skills, teamwork, communication abilities, project management experience, and an understanding of infrastructure development processes.
- **Smart Grid Engineer:** Electrical system design, power distribution knowledge, circuit analysis expertise, equipment installation experience, familiarity with electrical regulations and standards, adaptability, problem-solving skills, teamwork, communication abilities, project management experience, and an understanding of infrastructure development processes.

Upskilling/Training

- **EV Charging Infrastructure Engineer:** Upskilling requires developing expertise in EV charging technologies, grid integration, renewable energy systems, and smart charging management, while training in areas such as electric vehicle communication protocols, energy storage solutions, and sustainable infrastructure design.
- **Battery Energy Storage Systems Engineer:** Upskilling involves acquiring proficiency in battery energy storage technologies, grid integration, energy management systems, and high-voltage safety protocols, while training in areas such as battery chemistry, energy storage optimization, and electric power distribution.
- **Smart Grid Engineer:** Upskilling requires developing expertise in smart grid technologies, energy management systems, demand response strategies, and grid integration, while training in

areas such as electric vehicle charging management, vehicle-to-grid communication, and renewable energy integration.

Educational Requirements

- **Electrical Engineer (ICE-V):** Bachelor's degree in electrical engineering.
- **EV Charging Infrastructure Engineer (EV):** Bachelor's degree in electrical engineering, civil engineering, or related field.
- **Battery Energy Storage Systems Engineer (EV):** Bachelor's degree in electrical engineering or related field.
- **Smart Grid Engineer (EV):** Bachelor's degree in electrical engineering or related field.

EV Job Descriptions

EV Charging Infrastructure Engineer:

- EV Charging Infrastructure Engineers design and develop the charging stations and networks used to recharge EVs. They use their skills to create efficient and reliable charging solutions. These engineers follow specific guidelines and use their expertise to plan and implement charging stations in different locations.

Battery Energy Storage Systems Engineer:

- Battery Energy Storage Systems Engineers design and develop the systems that store and manage the energy used by EVs. They use their skills to create efficient and reliable ways to store energy from charging stations. These engineers follow specific guidelines and use their expertise to design systems that can store energy and provide it when needed.

Smart Grid Engineer:

- Smart Grid Engineers design and develop the advanced systems that control and manage the flow of electricity to support EVs. They use their skills to create intelligent grids that can efficiently distribute power and communicate with charging stations. These engineers follow specific guidelines and use their expertise to design systems that can adapt to different energy demands.

Civil Engineer – 2131 ➤ EV Charging Infrastructure Planner, Renewable Energy Integration Engineer, Grid Infrastructure Upgrading Engineer

ICE-V Job Description

Civil Engineer:

- Civil Engineers involved in infrastructure for ICE-Vs help design and plan the places where cars move, like roads and bridges. They use their skills to create safe and efficient paths for vehicles to travel on. These engineers also consider things like traffic flow, road safety, and how to make the infrastructure strong and long-lasting.

Transferable Skills

- **EV Charging Infrastructure Planner:** Infrastructure design, site planning expertise, project management experience, construction knowledge, familiarity with regulations and standards, adaptability, problem-solving skills, teamwork, communication abilities, environmental awareness, and an understanding of urban planning processes.
- **Renewable Energy Integration Engineer:** Infrastructure design, site planning expertise, project management experience, construction knowledge, familiarity with regulations and standards, adaptability, problem-solving skills, teamwork, communication abilities, environmental awareness, and an understanding of renewable energy integration processes.
- **Grid Infrastructure Upgrading Engineer:** Infrastructure design, site planning expertise, project management experience, construction knowledge, familiarity with regulations and standards, adaptability, problem-solving skills, teamwork, communication abilities, environmental awareness, and an understanding of grid infrastructure upgrading processes.

Upskilling/Training

- **EV Charging Infrastructure Planner:** Upskilling involves gaining proficiency in EV charging station design, urban planning for charging networks, grid integration, and sustainable infrastructure solutions, while training in areas such as electric vehicle charging demand analysis, site selection, and regulatory considerations.
- **Renewable Energy Integration Engineer:** Upskilling requires developing expertise in renewable energy systems, grid integration, energy storage technologies, and sustainable infrastructure solutions, while training in areas such as electric vehicle charging network design, smart grid integration, and energy management strategies.
- **Grid Infrastructure Upgrading Engineer:** Upskilling involves acquiring proficiency in grid infrastructure assessment, capacity upgrading strategies, electric vehicle charging demands, and

high-voltage safety protocols, while training in areas such as grid modernization, electric vehicle charging network expansion, and integration of renewable energy sources.

Educational Requirements

- **Civil Engineer (ICE-V):** Bachelor's degree in civil engineering.
- **EV Charging Infrastructure Planner (EV):** Bachelor's degree in urban planning, civil engineering, or related field.
- **Renewable Energy Integration Engineer (EV):** Bachelor's degree in electrical engineering, environmental engineering, or related field.
- **Grid Infrastructure Upgrading Engineer (EV):** Bachelor's degree in electrical engineering, power systems engineering, or related field.

EV Job Descriptions

EV Charging Infrastructure Planner:

- EV Charging Infrastructure Planners design and organize the locations and layouts of charging stations for EVs. They use their skills to plan where the charging stations should be placed for maximum convenience and accessibility. These planners follow specific guidelines and use their expertise to create efficient charging networks in various areas.

Renewable Energy Integration Engineer:

- Renewable Energy Integration Engineers find ways to connect clean and sustainable energy sources, like solar or wind power, to the charging of EVs. They use their skills to design systems that enable electric cars to be charged using renewable energy. These engineers follow specific guidelines and use their expertise to create efficient ways to integrate clean energy into the charging process.

Grid Infrastructure Upgrading Engineer:

- Grid Infrastructure Upgrading Engineers improve and enhance the electricity distribution systems to accommodate the increased demand from EVs. They use their skills to upgrade and modernize the power grids to handle the charging needs of electric cars. These engineers follow specific guidelines and use their expertise to design and implement improvements in the power distribution infrastructure.

Environmental Consultant – 2263 ➤ Sustainable Infrastructure Planner, Life Cycle Assessment Specialist, Battery Recycling and Disposal Coordinator

ICE-V Job Description

Environmental Consultant:

- Environmental Consultants involved in infrastructure for ICE-Vs help make sure that building roads, bridges, and other structures for vehicles does not harm the environment. They use their expertise to study the land and the impact of construction on nature. These consultants suggest ways to build while protecting plants, animals, and the air and water.

Transferable Skills

- **Sustainable Infrastructure Planner:** Sustainability assessment, environmental impact analysis, regulatory compliance knowledge, site evaluation expertise, data analysis, adaptability, problem-solving skills, teamwork, communication abilities, urban planning awareness, and an understanding of sustainable infrastructure planning processes.
- **Life Cycle Assessment Specialist:** Life cycle assessment expertise, environmental impact analysis, data analysis, regulatory compliance knowledge, adaptability, problem-solving skills, teamwork, communication abilities, sustainability awareness, and an understanding of life cycle assessment processes.
- **Battery Recycling and Disposal Coordinator:** Waste management knowledge, environmental regulations expertise, data analysis, regulatory compliance awareness, adaptability, problem-solving skills, teamwork, communication abilities, sustainability awareness, and an understanding of recycling and disposal processes.

Upskilling/Training

- **Sustainable Infrastructure Planner:** Upskilling requires gaining expertise in electric vehicle charging infrastructure design, renewable energy integration, carbon footprint reduction strategies, and sustainable urban planning, while training in areas such as electric vehicle adoption trends, charging network optimization, and green building standards.
- **Life Cycle Assessment Specialist:** Upskilling involves developing proficiency in electric vehicle components, battery systems, charging infrastructure, and renewable energy technologies, while training in areas such as life cycle assessment methodologies, battery recycling processes, and environmental impact analysis specific to electric vehicle production.
- **Battery Recycling and Disposal Coordinator:** Upskilling requires gaining expertise in battery chemistries, recycling processes, hazardous materials management, and sustainable waste

disposal practices, while training in areas such as battery end-of-life solutions, recycling regulations, and environmental compliance specific to electric vehicle batteries.

Educational Requirements

- **Environmental Consultant (ICE-V):** Bachelor's degree in environmental science, engineering, or related field.
- **Sustainable Infrastructure Planner (EV):** Bachelor's degree in civil engineering, urban planning, environmental science, or related field.
- **Life Cycle Assessment Specialist (EV):** Bachelor's degree in environmental engineering or related field.
- **Battery Recycling and Disposal Coordinator (EV):** Bachelor's degree in environmental science, materials science, or related field.

EV Job Descriptions

Sustainable Infrastructure Planner:

- Sustainable Infrastructure Planners design and organize the infrastructure, like charging stations and power grids, in environmentally friendly ways. They use their skills to plan and create systems that have minimal impact on the environment. These planners follow specific guidelines and use their expertise to design infrastructure that supports the use of electric vehicles while considering sustainability.

Life Cycle Assessment Specialist:

- Life Cycle Assessment Specialists understand and analyze the environmental impact of the entire life cycle of EVs and their supporting infrastructure. They use their skills to evaluate how different stages, from manufacturing to usage and eventual disposal, affect the environment. These specialists follow specific guidelines and use their expertise to assess the overall sustainability of EV infrastructure.

Battery Recycling and Disposal Coordinator:

- Battery Recycling and Disposal Coordinators manage the proper recycling and safe disposal of used batteries from EVs. They use their skills to ensure that the batteries are recycled in an environmentally friendly way or disposed of safely. These coordinators follow specific guidelines and use their expertise to organize the recycling and disposal processes.

Electrician – 7241 ➤ EV Charging Station Installer, Battery Energy Storage System Technician, EV Infrastructure Maintenance Technician

ICE-V Job Description

Electrician:

- Electricians involved in ICE-V infrastructure work with electrical systems that power various parts of transportation, such as traffic lights. They use their skills to install, fix, and maintain these electrical components. These electricians make sure the systems work safely and reliably.

Transferable Skills

- **EV Charging Station Installer:** Electrical system installation, wiring expertise, power distribution knowledge, equipment setup experience, familiarity with electrical regulations and standards, adaptability, problem-solving skills, teamwork, communication abilities, safety awareness, and an understanding of installation processes.
- **Battery Energy Storage System Technician:** Electrical system installation, wiring expertise, power distribution knowledge, equipment setup experience, familiarity with electrical regulations and standards, adaptability, problem-solving skills, teamwork, communication abilities, safety awareness, and an understanding of installation processes.
- **EV Infrastructure Maintenance Technician:** Electrical system maintenance, troubleshooting expertise, power distribution knowledge, equipment repair experience, familiarity with electrical regulations and standards, adaptability, problem-solving skills, teamwork, communication abilities, safety awareness, and an understanding of maintenance processes.

Upskilling/Training

- **EV Charging Station Installer:** Upskilling involves acquiring proficiency in electric vehicle charging technologies, charging station installation procedures, communication protocols, and high-voltage safety protocols, while training in areas such as different charging standards, charging station networking, and electric power distribution.
- **Battery Energy Storage System Technician:** Upskilling requires developing expertise in battery energy storage technologies, energy management systems, electrical integration, and high-voltage safety protocols, while training in areas such as battery chemistry, system diagnostics, and grid integration.
- **EV Infrastructure Maintenance Technician:** Upskilling involves gaining proficiency in electric vehicle charging technologies, charging infrastructure components, communication protocols, and high-voltage safety procedures, while training in areas such as EV-specific maintenance procedures, charging station diagnostics, and troubleshooting of electric vehicle systems.

Educational Requirements

- **Electrician (ICE-V):** High school diploma or equivalent education and completion of apprenticeship.
- **EV Charging Station Installer (EV):** High school diploma or equivalent education and completion of apprenticeship.
- **Battery Energy Storage System Technician (EV):** Diploma in electrical engineering technology, electronics, or related field.
- **EV Infrastructure Maintenance Technician (EV):** Diploma in electrical engineering technology, electronics, or related field.

EV Job Descriptions

EV Charging Station Installer:

- EV Charging Stations Installers set up and install the charging stations used by EVs. They use their skills to carefully assemble and install the charging equipment at various locations. These installers follow specific instructions and guidelines to make sure the charging stations are set up correctly and safely.

Battery Energy Storage System Technician:

- Battery Energy Storage System Technicians install and maintain the systems that store and manage the energy used by EVs. They use their skills to set up and ensure the proper functioning of these energy storage systems. These technicians follow specific instructions and guidelines to install and service the systems correctly.

EV Infrastructure Maintenance Technician:

- EV Infrastructure Maintenance Technicians keep the various components of the EV charging and energy systems in good working condition. They use their skills to inspect, repair, and maintain charging stations, energy storage systems, and other infrastructure elements. These technicians follow specific guidelines to ensure that everything is functioning properly and safely.