workforce WindsorEssex

THE GREEN ECONOMY IN WINDSOR-ESSEX

Canada EMPLOYMENT ONTARIO Ontario

Workforce WindsorEssex is a workforce and community development board whose mission is to lead regional employment and community planning for the development of a strong and sustainable workforce.

Workforce WindsorEssex is an experienced leader in the development of regional labour market tools, research, guides, and events that create positive change in the local labour market while saving others time and effort. These resources, created in close coordination with employment, education, and industry partners, are designed to help jobseekers, employers, students, and educators, as well as the community, make more informed labour market decisions using locally-responsive, data-rich, and unbiased resources.

To learn more about Workforce WindsorEssex and view our tools and resources, visit
www.workforcewindsoressex.com

We would like to thank everyone who contributed their time, ideas, and expertise to the Green Economy in Windsor-Essex Report.

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Canada EMPLOYMENT ONTARIO Ontario

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About the Author

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Introduction

Climate change is a global concern. While every nation is playing its own role, Canada has committed to reducing its carbon emissions by 40 to 45% below 2005 levels by 2030 and achieving net-zero by 2050, and multiple green initiatives have been adopted to meet these goals. To support these initiatives, the number of jobs in clean energy is expected to grow by 50% by 2030.[1]

In 2018, Ontario released their Made-in-Ontario Environmental Plan that commits to the same rigorous goals and outlines their plans to reduce the amount of waste that goes to landfill, keep our waters clean, protect our air and natural spaces, and hold polluters accountable.[2]

As we move toward the goal of a federal and provincial green economy, which is defined as low-carbon, resource-efficient, and socially inclusive,[3] local government and businesses can expect to face their own transition to more sustainable practices. In recent years, Windsor-Essex has implemented many green initiatives to maintain a clean environment for the region, with the added support of investments from the provincial and federal governments. This has resulted in increasing demand for those that work in green industries, including Electrical Engineers, Appliance Repairers, and Powerline Technicians. As the green industry expands over the next few years, local jobseekers will be presented with more opportunities for employment. If the green sector is something that appeals to you, this guide will help you research pathways to jobs that match your skill set, experience, or interests.

Green jobs can range from environmental engineers to accountants working in green companies. No matter what your educational or experiential background, remember that green jobs exist everywhere, and they span across multiple industries. If you're interested in a job in the green economy, this guide will help you understand which local educational programs are green-oriented, which green jobs are currently available and will soon be in-demand, and how to develop your skillset to enter the green industry.

[1] "Canada's Climate Plans and Targets." Government of Canada, March 29, 2022.
[2] "Climate Change." Government of Ontario, August 16, 2021.
[3] "Green Economy." UN Environment Programme, 2023.

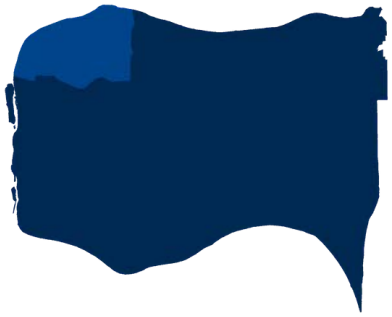
Methodology

For the purposes of our research, we are defining the green economy as a combination of industrial, governmental, and development activity that supports the region's efforts for sustainability and environmental benefit. There are many industries that fall under the green economy, including agriculture, manufacturing, and repair and maintenance, and there continue to be new industries emerging in the space as our local and national economy moves toward cleaner, greener economic priorities. With this, it is challenging to specifically identify all industries and occupations relevant to the green economy. For our purposes, we have identified industries that capture the majority of green economic activity, following the direction outlined in Future Skills Centres *Green Occupation Pathways*. See Appendix for the full list of industries. To create more effective action in the reduction of carbon emissions and development of clean technologies, it is important to understand and identify the labour force needs required to sustain these industries.

This report relies on data acquired through online consultations, conducted by Workforce WindsorEssex, with local green businesses, environmental representatives from the City of Windsor and the County of Essex, and leaders/mentors from the i.d.e.a. Fund, a federally funded program that supports green businesses in the area. It also sources wage data from Statistics Canada and the Job Bank. Finally, journal articles and online sources were utilized to research relevant best practices and resources for jobseekers.

The Environment in Windsor-Essex

CITY OF WINDSOR



According to the City of Windsor's Greenhouse Gas Inventory Report released in 2018, there are many methods to reduce emissions that ultimately fall under the purview of the municipal government.[4] As a result, the City has developed reports to assess the levels and sources of greenhouse gas (GHG) emissions locally, as well as their own science-based targets for the future. As of 2017, City Council approved the following targets:

- A 68% reduction in city-wide emissions and a 55% reduction in corporate-wide emissions below the 2005 baseline by 2030
- A net-zero target for 2050

In its latest report, the City of Windsor tracked the corporate and community output of GHG emissions to find that buildings are the largest corporate emitters, accounting for 58% of all corporate emissions. Due to a large decrease in sewage emissions, there has been a 10% reduction in corporate-wide emissions below the baseline year of 2005, which is a promising start to their goal of 55%. As local businesses look to retrofit their infrastructure, invest in more energy efficient upgrades, and assess opportunities for use of renewable materials, the demand for workers with experience and skills for the green economy will continue to grow.

[4] "Windsor's Greenhouse Gas Emissions." The City of Windsor, 2023.

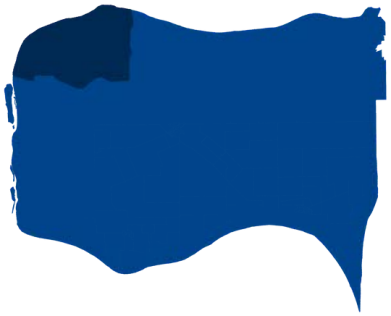
Regarding the community output of GHG emissions, transportation accounts for 38% of community emissions. In 2005, industrial was by far the biggest emitter, accounting for 50% of all community emissions. As of 2019, there has been a 50% decrease in community emissions.[5] As Windsor-Essex moves to become the automobility capital of Canada, there will be demand for electric vehicles, as well as the mechanics skilled to fix and service them. The current skill shortage for auto service technicians creates an even greater demand for those with additional skillsets to work on electrical aspects of new vehicles.

The progress made over the past decade is encouraging, and some of it can be attributed to green initiatives enacted by the City of Windsor. Namely, the City has converted all traffic signals and streetlights over to light emitting diode (LED) technology, which has reduced the City's total electricity usage by 5%. In August 2022, the City committed to a $2.4 million investment to shift 12 local facilities to renewable energy consumption through the installation of new solar photovoltaic (PV) systems, creating more job opportunities for construction workers that are certified in PV installation. They've also released a Community Energy Plan, Corporate Climate Action Plan, and Climate Change Adaptation Plan that outlines their goals and projects over the next few years.

Though the COVID-19 pandemic stalled many of the City's plans, some of the projects currently underway or in the early testing stages include solar panel installation, feasibility of retrofitting homes to make them more energy efficient, feasibility of battery storage, and a study on how to get City buildings to net-zero. As these plans are rolled out, we can expect to see a significant increase in jobs in construction and electrical work, which will be essential to the construction of energy efficient buildings and homes.

[5] "Windsor's Greenhouse Gas Emissions." The City of Windsor, 2023.

COUNTY OF ESSEX



Having declared a climate emergency in 2019, the County of Essex has been working diligently on several green initiatives targeting energy consumption, greenhouse gas emissions, active transportation, and waste diversion.

The County of Essex's Regional Energy Plan (REP) outlines their goals for energy reduction and economic prosperity. The report details their energy consumption as of 2019, attributing 38% to greenhouses, 22% to residential, and 20% to transportation. They also noted that buildings in Essex were, on average, half as efficient as global benchmarks, and their overall emissions were five times higher than the global best practice and eight times higher than the Paris Agreement goals (the globally accepted benchmarks for climate action).[6]

The goals outlined in the REP, accepted in principle, are as follows:

- Increase energy efficiency by at least 50% by 2041
- Reduce GHG emissions by at least 60% by 2041
- Return at least $15 billion to the local economy by 2041 and create at least 1,000 jobs by 2025

To achieve these goals, the County has taken on several supportive initiatives. With respect to transportation, the County Wide Active Transportation System (CWATS), which spans some 400km across all seven local municipalities in Essex County and links to trail systems in Windsor and Chatham-Kent, is expected to expand to about 1,000km over the next 15 years. This will include the redevelopment of the abandoned 47km Canada Southern Railway (CASO) line that runs through Essex County, creating more jobs for construction workers.

Further, in 2025, the County of Essex and City of Windsor can expect changes to their waste and recycle collection through the launch of a new Organics program, which will introduce a bi-weekly compost pick-up, creating additional opportunities for general waste diversion from landfill and an overall reduction in greenhouse gas emissions.

[6] "Essex County Regional Energy Plan." County of Essex, 2019.

Overall, the County is continuing to pursue sustainable goal development and attainment as they work toward further awareness and knowledge of the climate crisis. Concurrently, staff are investigating investments in a green fleet for emergency services while focusing on the necessary investments that will support sustainable growth in the region. These new projects will create jobs in research and development, and as the number of green vehicles continues to grow, we can expect to see an increase in demand for mechanics and engineers specializing in transitioning and maintaining green transportation.

Through the new 2022-2026 term, the County of Essex, and its local municipalities, have opportunities to deepen their commitment to green initiatives. The County, for example, will complete its Official Plan review and establish a new strategic plan. Together, these policy documents and guides will include new goals and objectives, which may contemplate aligned goals in regional transit, roadway expansion, and sustainable development.

Green Jobs

Green jobs are defined as any employment that contributes to maintaining a sustainable environment. Due to this broad definition, green jobs cover a large variety of occupations, from environmental engineers to greenhouse technicians. Administrative and financial positions in green companies are also considered green jobs, as they all play key roles in developing and maintaining a green economy. For the purposes of this report, we've narrowed the list down to exclusively green roles that are available in Windsor-Essex and are linked to local educational programs, sourced primarily from ECO Canada's Career Profiles page,[7] as well as the National Occupational Classification (NOC)[8] in our understanding of the local green industry.

Over the next few years, key industries in Windsor-Essex will be integral to sustaining an environmentally conscious economy and introducing green jobs locally, namely manufacturing, agriculture, and transportation. Since the manufacturing industry accounts for over 30% of Windsor-Essex's workforce, and investments in renewables have increased in our area, we can expect to see major transformations in this industry's role in the green economy. Most notably, Windsor-Essex has been a recent recipient in clean energy funding from a joint investment from the federal and provincial governments and Stellantis, totaling $3.6 billion in their Windsor and Brampton plants to begin retooling and manufacturing EVs, as well as the $4.9 billion investment in Canada's first lithium-ion EV battery manufacturing plant. The company is expected to generate over 2,500 new jobs, green jobs, including 650 engineering jobs to run a lab dedicated to EV research.[9]

[7] "Explore Environmental Career Profiles." ECO Canada, January 24, 2023. https://eco.ca/career-profiles-index/.
[8] "National Occupational Classification." Government of Canada, March 1, 2021. https://noc.esdc.gc.ca/.
[9] Waddell, Dave. "Stellantis Announces $3.6B Investment in Windsor, Brampton Plants." Windsor Star, May 2, 2022. https://windsorstar.com/news/local-news/stellantis-announces-production-plans-for-windsor-assembly-plant.

Below is the number of active and new job posts, the average posting duration in days, and the number of companies hiring in Windsor-Essex's Green Economy in September 2023.[10] This data was sourced from Workforce WindsorEssex's Labour Markets Insights Report by isolating energy production, energy efficiency, and environmental management industries in Windsor-Essex (see Appendix for the full list of industries). As half of the job postings were newly introduced in the month of September, we can recognize a significant increase in demand for positions in the green economy. With over 100 companies in the green economy hiring, there is variety in the roles available, whether they are obvious positions such as Environmental Analysts, Appliance Retrofitters, and Electrical Engineers, or non-obvious positions such as Automotive Service Technicians, Powerline Technicians, or Accountants. It should be noted that these industries could include jobs in the manufacturing industry that are not currently green, but as the region accelerates its transition from automotive to automobility, the number of green jobs in the industry will increase to reflect that transition.

ACTIVE JOB POSTS	NEW JOB POSTS	AVERAGE POSTING DURATION (DAYS)	COMPANIES HIRING
303	173	28.3	106

The following section contains a list of jobs that can currently be pursued in Windsor-Essex, as well as occupations that will be introduced as the EV sector develops. The education requirements are listed as programs that are available locally; the median hourly wages are representative of the Windsor-Sarnia economic region, last updated November 2022. According to data sourced from Statistics Canada, covering the Windsor-Sarnia economic region from 2022 to 2023, the number of job vacancies in the following roles have fluctuated in the past year, but they do indicate a current demand for new applicants.[11]

[10] Labour Market Insights Report. Workforce WindsorEssex. 2023
[11] Statistics Canada. Table 14-10-0356-01 Job vacancies and average offered hourly wage by occupation (broad occupational category), quarterly, unadjusted for seasonality

Circular Economy

Proponents of the green growth model emphasize the importance of transitioning to a "circular economy [which] stresses the reduced use of raw materials, the reuse of products, waste streams (where waste is converted to a valuable resource), and the recycling of products, the combined effect of which will ensure that materials are retained in the loop as opposed to a linear economy which is based on a manufacture, use, and disposal model."[12] In a circular economy, goods are manufactured from recycled materials, constructed to maximize sustainability and utilization time, and once they have surpassed their utility they are once again recycled and reintroduced into the production cycle. This model promotes waste minimization and innovation to determine novel uses for waste materials and byproducts, as well as a reduction in single use or short-term use products.

Greenhouse Worker

NOC 8432

Description:

Greenhouse Workers plant, cultivate, and harvest trees, shrubs, flowers, and plants, and serve nursery and greenhouse customers. They are responsible for day-to-day plant and crop care, ensuring that plants receive the correct levels of nutrients and are planted and maintained following best practices.

Education:

- High school diploma
- Diploma in the Greenhouse Technician program is an asset

Median Hourly Wage: $17.00

Industrial Engineer

NOC 2141

Description:

Industrial Engineers in the EV industry will be responsible for optimizing the production processes and systems used to manufacture EVs. Their work will focus on improving efficiency, productivity, and safety in EV manufacturing. You will play a crucial role in streamlining operations to ensure that EVs are produced with the highest quality standards while minimizing costs and environmental impact.

Education:

- Degree in Industrial Engineering

Median Hourly Wage: $42.40

[12] Thomas, Sabu, and Maya Jacob John. *Bio-Based Materials: Contribution to Advancing Circular Economy*. Edited by Sabu Thomas and Maya Jacob John. MDPI - Multidisciplinary Digital Publishing Institute, 2023., pp. 1

THE GREEN ECONOMY IN WINDSOR-ESSEX

Landscape Technician/Horticulturist

NOC 2225

Description:

Landscape Technicians/Horticulturists deal with issues related to horticulture, such as irrigation, breeding, cultivation, and the studying of plants. They also treat injured and diseased trees and plants, as well as monitor plant growth to collect and analyze integral data on best practices.

Education:

- Diploma in the Landscape Horticulture program
- Horticultural Technician Apprenticeship

Median Hourly Wage: $18.03

Mechanical Engineering Technologists and Technicians

NOC 2232

Description:

Mechanical Engineering Technologists and Technicians provide technical support and services or may work independently in mechanical engineering fields such as the design, development, maintenance, and testing of machines, components, tools, heating and ventilating systems, power generation and power conversion plants, manufacturing plants, and equipment.

Education:

- Diploma in the Electromechanical Engineering Technician – Robotics, Electromechanical Engineering Technology– Robotics, or Electronics Engineering Technology – Industrial Automation programs

Median Hourly Wage: $35.00

Water and Waste Treatment Plant Operator

NOC 9243

Description:

Wastewater Treatment Operators oversee the activities and processes that go into treating municipal drinking water. They are responsible for regulating the water quality and production to comply with environmental guidelines. Waste Systems Operators manage solid or liquid waste collection and disposal systems, train drivers in how to handle waste, and ensure safe operation of disposal facilities.

Education:

- High school diploma
- Diploma/degree in Engineering or Environmental Studies is an asset

Median Hourly Wage: $33.50

Sustainable Transportation

The development of sustainable transportation is a crucial contributing factor in the transition to a green economy, and it can come in the form of increased low-emissions public transit infrastructure, EVs, and renewable energy or alternative fuel sources. The green growth model still requires the mobility of the labour force, manufactured goods, resources, and materials that maintain the flow of the economy, thus the emphasis within the model is to reduce the environmental impact of these flows while they continue to increase in volume.

EV Mechanic/Technician

NOC 2232

Description:

EV Mechanics/Technicians will be at the forefront of the green revolution in the automotive industry. Their main responsibility is to diagnose, repair, and maintain EVs, ensuring they run efficiently and safely. You'll be working on cutting-edge technology, contributing to the advancement of eco-friendly transportation.

Education:

- Diploma in the Electric Drive Vehicle Technician program
- Automotive Service Technician Apprenticeship

Median Hourly Wage: $33.70

Mechanical Engineer

NOC 2132

Description:

Mechanical Engineers in the EV industry will be a crucial part of designing and developing cutting-edge EV technology. Their role involves applying principles of mechanical engineering to create and improve various components of EVs. By using your skills and knowledge, you will contribute to making EVs more reliable, efficient, and environmentally friendly.

Education:

- Degree in Mechanical Engineering

Median Hourly Wage: $38.46

Renewable Energy

Making the transition toward renewable energy is pivotal in the transition toward a green economy.[13] Though there are significant political and market challenges to transitioning to renewable energy, particularly in regions that are economically reliant upon oil trade, there are also significant economic opportunities in renewable energy. In the short-term, the creation of renewable energy-based infrastructure will generate jobs in the new sector, and in the long-term the transition to renewable energy will likely correlate to significant growth in the new sector.

Wind Turbine Technician

NOC 2243

Description:

Wind Turbine Technicians are responsible for inspecting and maintaining the exterior and physical integrity of turbine towers. They test and troubleshoot electrical, mechanical, and hydraulic components and systems while performing routine maintenance on wind turbines.

Education:

- Diploma in the Power Engineering Technician program

Median Hourly Wage: $43.27

[13] “Canada’s Climate Actions for a Healthy Environment and a Healthy Economy.” Government of Canada, July 22, 2022. [1] Thomas, Sabu, and Maya Jacob John. Bio-Based Materials: Contribution to Advancing Circular Economy. Edited by Sabu Thomas and Maya Jacob John. MDPI - Multidisciplinary Digital Publishing Institute, 2023., pp. 1

Green Infrastructure

At the community level, future infrastructure and urban planning projects should be undertaken with environmental considerations. Introducing energy efficient green infrastructure in urban planning can help to reduce municipalities' long-term reliance on fossil fuels, reduce carbon emissions, and increase quality of life for residents. Increasing and protecting urban greenspace not only acts as a carbon sink, but also offers residents a healthy, enriching outdoor space.

Electrician

NOC 7241

Description:

Electricians lay out, assemble, install, test, troubleshoot, and repair electrical wiring, fixtures, control devices, and related equipment in buildings and other structures. An electrician in the green economy can be responsible for the electrical installation and maintenance of energy efficient structures.

Education:

- Diploma in the Electrical Engineering Technician program
- Electrical Apprenticeship

Median Hourly Wage: $32.00

Electrical and Electronics Engineer

NOC 2133

Description:

Electrical and Electronics Engineers in the EV industry will be at the forefront of designing and developing electrical systems that power and control EVs. Their work will contribute to the advancement of EV technology, making transportation more sustainable and efficient. You will be responsible for creating innovative solutions that enhance the performance and safety of EVs.

Education:

- Degree in Electrical Engineering

Median Hourly Wage: $46.20

Powerline Technician/Cable Worker

NOC 7244

Description:

Electrical Powerline and Cable Workers are responsible for Installing, maintaining, troubleshooting, and repairing electrical distribution and transmission systems including overhead and underground power lines and cables, insulators, conductors, lightning arrestors, switches, transformers, and other associated equipment.

Education:

- Diploma in the Powerline Technician program

Median Hourly Wage: $43.75

Residential and Commercial Installers

NOC 7441

Description:

Residential and Commercial Installers install and service a wide variety of interior and exterior prefabricated products, including solar panel installation and EV charging stations, which help to create and maintain a low-carbon environment.

Education:

- High school diploma
- Diploma in the Electrical Engineering Technician program

Median Hourly Wage: $19.00

Policy Frameworks, Community Partner Engagement, and Recommendations

For the transition to a green economy to be possible, there must be proactive concrete policy change, supported by significant government incentives. Instituting financial incentives for developing green technology and infrastructure has proven successful in case studies from Germany and Finland,[14] and are currently being implemented in Canada's Climate Plan[15] with considerations in the 2023 Federal Budget[16]; however, these incentives must find their way to practical action at the community level to be impactful. Part of maximizing the effectiveness of these incentives is community engagement, meaning directly involving business owners, developers, municipal governments, and citizens in the implementation of green initiatives.

Environmental Technologist/Technician

NOC 2221

Description:

Environmental Technologists/Technicians are responsible for collecting air, water, and soil samples to determine contamination levels and assess environmental conditions. They then develop reports to determine if the local results meet the national standards and assess what corrections are needed to meet them.

Education:

- Degree in Environmental Science or Environmental Engineering

Median Hourly Wage: $38.46

Urban and Land Use Planner

NOC 2153

Description:

Urban and Land Use Planners are responsible for preparing sustainable land use plans for housing, transportation systems, farms, and parks. They study the physical land and an area's people to ensure that land use plans are appropriate and that the environment is protected.

Education:

- Degree in Civil Engineering, Environmental Engineering, or Environmental Science/Studies

Median Hourly Wage: $46.70

[14] Pitkänen, K., R. Antikainen, N. Droste, E. Loiseau, L. Saikku, L. Aissani, B. Hansjürgens, P.J. Kuikman, P. Leskinen, and M. Thomsen. "What Can Be Learned from Practical Cases of Green Economy? –studies from Five European Countries." Journal of cleaner production 139 (2016): 666–676.
[15] "Canada's Climate Actions for a Healthy Environment and a Healthy Economy."Government of Canada, July 22, 2022.
[16] The Conference Board of Canada. (2023, March 29). Clean and Green but Not Very Lean: Our Analysis of the Federal Budget 2023. conferenceboard.ca.

Education

The following section lists green programs (programs that could potentially lead to employment in the green sector) offered at St. Clair College and the University of Windsor. Some of these programs will lead students directly to green jobs, such as EV-focused programs, while others will give students the opportunity to utilize their skills in the green industry, should they have the interest to do so. As the green sector continues to expand, so will the potential for other programs to become green-focused or applicable to the industry.

According to enrollment data sourced from St. Clair College and the University of Windsor, enrollment in the following programs has increased over the past five years, demonstrating a growing interest in green education and the potential demand for more programs to be developed.

ST. CLAIR COLLEGE

Electric Drive Vehicle Fundamentals

This program will introduce students to the aspects of EV fundamentals, both theory and practical. Students will study Electric/Electronic fundamentals, electrified vehicle systems and components, High Voltage safety, and EV maintenance. Students will learn vehicle architectures and the Low Voltage (LV)/High Voltage (HV) electrical power fundamentals which dictate the operation and diagnostics of systems used on EV - PHEV (Plug-in Hybrid Electric Vehicles) - HEV (Hybrid Electric Vehicles). Students will study how to properly select and use testing tools and equipment by using approved industry standards while performing system fault analysis.

Electric Drive Vehicle Technician

This diploma program will prepare a student for a career as an Electric Vehicle Technician in the maintenance, service, and repair of EVs, PHEVs (Plug in Hybrid Electric Vehicles), and HEVs (Hybrid Electric Vehicles). The first year of this program will introduce students to the aspects of EV theoretical and practical fundamentals. Upon completion of the first year, the student will obtain a certificate in Electric Vehicle Fundamentals and may choose to seek employment in the industry as a service maintenance helper or enter an apprenticeship program. The student may also continue into the second year and obtain the Electric Vehicle Technician diploma.

Power Engineering Technician

This program has been developed for those seeking employment as a power engineering technician who operates and troubleshoots the energy components in industrial power plants (chemical, food, pulp and paper, etc.), electrical power plants (coal, gas, nuclear, wind, solar, methane, cogeneration, flex fuel, etc.), or commercial buildings. The work may involve system monitoring and work with boilers, turbines, and condensers in steam power plants and internal combustion engines.

Greenhouse Technician

This program will provide students with the knowledge necessary to work in the greenhouse sector as Greenhouse Technicians. These operations could include vertical or container farms where vegetables, flowers, fruits, microgreens, and other crops are grown and harvested. Graduates are expected to find work in greenhouse production, assistant and head growers, pest management specialists, supervisors, or managers, and logistics team opportunities. The graduates may be employed in Ontario's greenhouse sector or the support services such as suppliers (fertilizers, etc.), manufacturers, logistics, and government positions (production technicians).

Powerline Technician

Students in the Powerline Technician program prepares students for a career in power distribution. It will provide in-depth knowledge and skills that will allow students to understand the installation, operation, and maintenance of the distribution system. Some of the principles taught will be electricity fundamentals and transformer theory, with reference to the distribution standards. In addition, there is an introduction to the design of distribution systems, and CAD design. The skills required for the operation of boom-equipped vehicles, powerline rigging, and fall protection will be taught, with an emphasis on safety.

Electronics Engineering Technology – Industrial Automation

Electronic engineering technologists assist in the design, programming, manufacture, and operation of electrical/electronic control systems. They design and troubleshoot systems to ensure efficient process operations and perform system programming functions. Students will gain skills and knowledge across multiple aspects of industrial automation including fundamental electrical analysis, industrial wiring, motor control, and automation principles. Students will also learn to design automation and systems that are safe to operate and eliminate repetitive operator work in order to manufacture quality products.

Landscape Horticulture

A Horticulture Technician provides product and service expertise with landscape design and construction including grounds maintenance. The landscape technician is trained to operate and run greenhouses and manage retail garden centres including the care of interior plants in commercial complexes.

Electromechanical Engineering Technician – Robotics

Students in the Electromechanical Engineering Technician - Robotics program will gain a solid foundation in programmable logic controllers, electronics, computer-aided design, mechanical systems, computer and robot programming, sensors, and actuators. Graduates will be prepared to program, troubleshoot, and maintain robots and automated production systems along with mechanical, hydraulic, and pneumatic equipment. Graduates will also be equipped to assist in the application and design of robotic systems, their manufacturing, and testing.

Electromechanical Engineering Technology – Robotics

Students in the Electromechanical Engineering Technologist program will learn valuable skills to work as designers and programmers in the automation and robotics fields. Upon graduation, students will have industry-ready skills in industrial robot programming, PLC programming, machine vision, electrical design, welding, simulation, fluid power, mechanical design, and project management.

UNIVERSITY OF WINDSOR

Biological Sciences

Students in the Biological Sciences program will learn research techniques in new labs and out in the field that will prepare them for a wide range of career paths, ranging from interests at the molecular level, to whole organisms (including humans), and/or the more complex community and ecosystem levels. Students can specialize in microbiology, cellular development, environmental and evolutionary biology, population and ecosystem ecology, or any combination of these areas.

Environmental Engineering

In the first Environmental Engineering degree program in Canada, students in this program will get exposure to all aspects of the field — air, water, solid waste, sustainability, and more. The University of Windsor is home to the Great Lakes Institute for Environmental Research, giving students the opportunity for collaboration between science and engineering.

Environmental Science/Studies

Students in the Environmental Science/Studies program are provided with comprehensive and balanced training in the physical and living environment – atmosphere, hydrosphere, geosphere, and biosphere. Through a systems-based approach, they will learn and apply a diversity of scientific tools and skills to understand the structure, function, and health of the Great Lakes: a globally important freshwater resource.

Electrical Engineering

Students in the Electrical Engineering program will learn how to upgrade, maintain, and build electrical systems to meet specific energy delivery needs, as well as gain an understanding of foundational topics in microelectronics, sensors, computer engineering, robotics, communications, and power generation and distribution.

Mechanical Engineering

Students in the Mechanical Engineering program develop a solid foundation in machine design, CAD, and thermofluids with applications in automotive, aerospace, manufacturing, and materials engineering. Available specializations include automotive, aerospace, environmental, and materials.

Civil Engineering

Students in the Civil Engineering program will learn how to plan effective, large-scale projects that manage resources and balance considerations, including cost, quality, and speed. It will also give them an understanding of foundational topics in construction, geotechnical, structural, municipal, transportation, hydraulic, and water resource engineering.

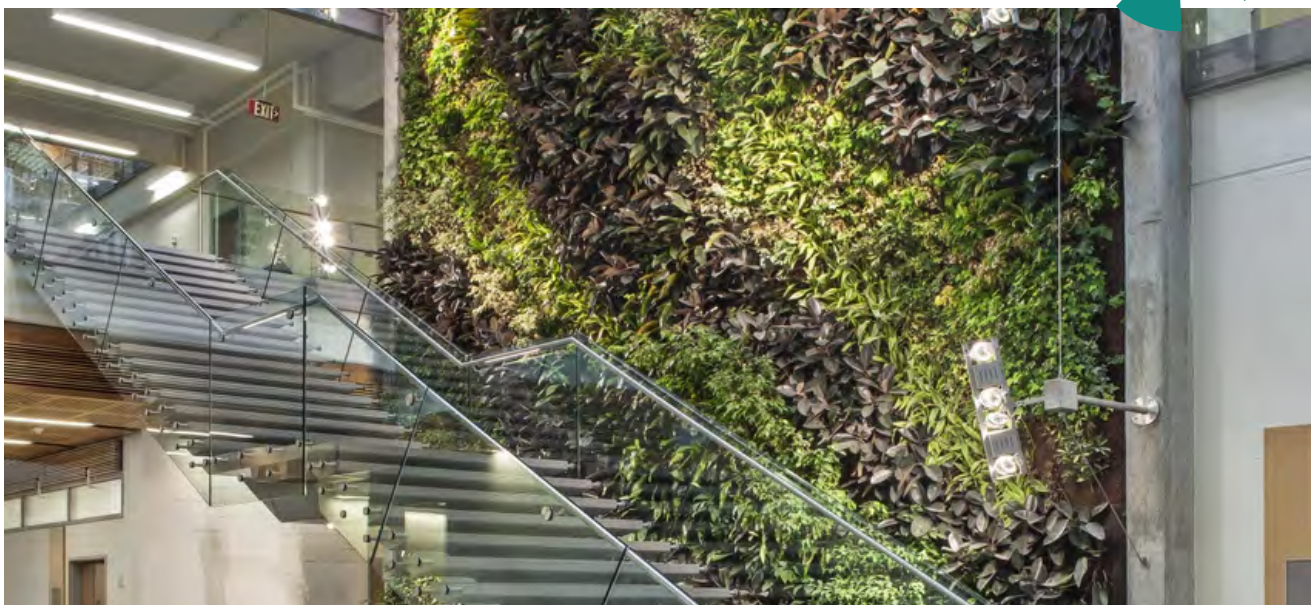


Photo Credit: University of Windsor, Ed Lumley Centre for Engineering Innovation

Green Businesses in Windsor-Essex

Local green businesses are leading green innovation with inventive methods of reducing waste while increasing profits, from 3D printing to reduce material waste to community farming and composting programs. Meanwhile, non-green businesses are playing their own role by adopting green practices to contribute to a low-carbon economy. **Here are some local green businesses and innovators that are contributing to Windsor-Essex's growth in the green industry:**

Climate Neutral

Climate Neutral is a cleantech company focused on helping the private and public sector leverage their data to address climate change. It's their belief that the transition to a green economy relies on having critical data. Their unique software builds profiles for their clientele that model their actions, track their emissions, and outline their environmental impact all the way to the year 2050. This software aids in streamlining a municipality or business's internal capabilities, allowing them to bring invaluable insights to key decision-makers and mapping out methods to reduce their carbon footprint.

NEXTSTAR ENERGY

NextStar Energy is an innovative joint venture company between LG Energy Solution and Stellantis with a mission to revolutionize the North American EV industry. They're doing this by investing in the construction of a cutting-edge battery manufacturing plant in Windsor, Ontario. This state-of-the-art facility will be the first of its kind in Canada and is being built with the goal of becoming the foremost battery hub in North America. Once fully operational, the new plant will create an estimated 2,500 jobs, comprising of 500 engineers, 400 technicians, and 1,550 operators

SKIVIYAAN
NEXT GEN SILK

SkiviYaan is an agricultural biotechnology start-up based out of Windsor, Ontario and Winnipeg, Manitoba, headed by Dr. Chandan Bhambhani who has a family background in silk yarn processing and over 20 years of professional experience in recombinant DNA technologies. SkiviYaan aims to produce 100% natural bioengineered silkwool fibre, using gene fusion technology by genetically engineering silkworms. The innovative silk and wool gene fusion technology will result in a combination of silk and wool characteristics in a single composite fibre from silkworms alone, reducing the dependency on sheep-farming and the associated costs. Their product will also reduce the carbon footprint generated from animals raised for wool production and by reducing the utility of several cheaper silk-wool blend look-alikes, which are made using manufacturing processes that are harmful for the environment.

Recommendations

For Community Partners and Decision-Makers

Green Programs

There is an opportunity for more funding for government programs designed specifically to support green businesses or businesses who want to transition to green practices. Programs that do exist are often geared toward larger and more established companies, or those operating as a non-profit. Existing programs should ease the eligibility restrictions around their applications or new programs should be created to properly support new businesses and promote innovative green practices and go beyond wage subsidies. To ensure that government funding is used to its fullest extent, a more rigorous application process should be adopted that measures the value of the project/idea, including the potential for success and the capacity for waste reduction. The **i.d.e.a. Fund** exemplifies this approach, as it invests directly into seedling companies with significant potential for growth through a thorough selection process. Further investments in environmentally oriented seedling projects, such as composting businesses or the production of inventive green products, end up benefiting the community, as well as all individuals who can now utilize more accessible green alternatives. Prioritizing innovation will be the cornerstone to transitioning to a successful green economy.

Incentives and Limits

While switching to green practices often ends up benefiting a business in the long-run (financially, reputationally, and environmentally), making the initial switch can be costly and can be deferred to another time in the future. Therefore, it is necessary to incentivize businesses to make the switch earlier. These incentives can come in the form of grants and loans, for those who adopt green practices, or it could be in the form of offering a free consultation session to those interested in adopting green practices. Green consultation services outline the many ways a company can cut costs and reduce waste to save them money and time, making the return on investment for changing infrastructure and practices more attractive to businesses. Alternatively, barriers can be put in place to limit or penalize a company's GHG emissions. In some cases, failing to curb waste and emission levels, leaves companies with higher profits, and no incentive to mitigate their unwanted outputs. As such, placing limitations or penalities on these aspects can aid in reducing our overall GHG emissions, especially in a city with a dense manufacturing industry. While Windsor's Corporate Climate Action Plan (CCAP) regulates the energy and GHG emissions produced by City-controlled operations, local businesses that contribute greatly to these emissions don't fall under the CCAP and are left to self-regulate their waste and emissions, prolonging their unsustainable practices. Businesses should be encouraged to view "going green" as a return on investment in the future, adopting energy efficiency and waste reduction to enhance their own business financially and reputationally, while contributing to a cleaner environment.

Green Initiatives, Promotion, and Awareness

Municipal government and its agencies, boards, and commissions, play a large role in mitigating and adapting to climate change. As a green economy is defined as low-carbon and resource-efficient, local government is responsible for a continuous rollout of green initiatives that ensure a sustainable environment and support local green businesses and environmental employment. Just as important, green plans and projects should be promoted to increase awareness of the ongoing climate crisis and the shifting labour market. Community support and participation are key to furthering a region's climate plan; informing residents on how to practice sustainability in their personal households and what kind of green jobs are available/becoming available are essential to reaching a green economy's full potential.

Explore Best Practices from other Countries

As Windsor-Essex continues its transition to a green economy, it's important to refer to environmental experts to determine the best methods of easing into a sustainable and profitable green economy. There is a growing misconception that the road to sustainability is de-growth, the idea that using less resources is the only path to a low-carbon economy, and using less resources will inevitably result in a declining economy. However, according to a report released by the United Nations Environment Programme (UNEP), businesses and governments will benefit greatly from making the switch to a green economy. Moreover, it is a necessary transition and investment in the future of our local environment.[17] Countries like Kenya, Ghana, Colombia, and EU nations have demonstrated how the government, with the support of businesses, can work toward a resource efficient and socially inclusive environment that is profitable and maintains the growth of the economy. For example, Kenya's Equity Bank has joined with partners to provide loans to farmers enabling access to water-efficient irrigation technology at a low interest rate, which has increased the bank's profit by almost 30% in a year. In Colombia, the Colombian Coffee Growers Federation ensures a sustainable income for more than 27,000 coffee growers with its Rainforest Alliance certified coffee.[18] These case studies demonstrate how adopting green practices in the most vital parts of a nation's economy can maintain or even accelerate growth, while ensuring a sustainable environment and equitable workplace.

[17] "The Business Case for the Green Economy: Sustainable Return on Investment." United Nations Environment Programme. 2012.
[18] Ernest Baba Ali et al. "Green economy implementation in Ghana as a road map for a sustainable development drive: A review" Scientific African, no. 12 (2021): https://doi.org/10.1016/j.sciaf.2021.e00756.

For Employers

Participate in Accelerator Programs

A prominent resource for up-and-coming green businesses is the **i.d.e.a. Fund**. The program provides green companies with $30,000 of seed funding, with matching funding, and 40 hours of fully funded, targeted support from subject matter experts. In Windsor-Essex, the program is headed by **WEtech Alliance**, making them responsible for selecting eligible local businesses and providing them with the support of the program. In their first cohort, they provided 19 local companies with $567,700 of total funding, and in the second cohort, which is currently underway, they've selected 20 local companies to receive $600,000 worth of funding.

Invest WindsorEssex also facilitates the **Foodpreneur Advantage and Foodpreneur Scale-up programs**, which support small businesses and start-ups in the food sector and production industry. Value-added aspects of accelerator and cohort-based programming are mentorship from local business advisors, and peer-to-peer connection with other small business and start-up owners.

Make Connections

Green businesses that participate in cohort-based programming benefit greatly from the mentorship provided by the program. As such, it would be worthwhile to create a program centred around knowledge-sharing. Since a board of experts is not always an accessible tool, establishing a network where green businesses can connect can be just as beneficial. Well-established businesses can share their accrued knowledge with seedling businesses, ideas can be circulated, and businesses can create partnerships with simpatico companies. It also has the potential to break down the competitiveness of the industry, as many green businesses are moving toward a common goal (creating a sustainable environment), and cooperation should be encouraged. A website or common space where green businesses can gather would be a good first step to establishing a local green network.

Research Training Opportunities

If you want to adopt or develop green practices in your business, start researching training opportunities for your staff. Consider upskilling programs or seminars that can introduce your staff to sustainability practices that they can then implement in the workplace. In addition to enhancing your current staff, consider expanding your workforce by utilizing wage subsidy programs, such as those offered by **ECO Canada** or the **Canada-Ontario Job Grant** to hire a sustainability officer or candidates with an educational or professional background in the environment. ECO Canada offers nine different wage subsidy programs, ranging from financial support for foreign talent, skill development for youth, and co-op and apprenticeship opportunities. Their wage and training funding help green businesses develop and grow their workforce, while their accreditation, education, and training programs assist students and jobseekers who are interested in joining the green sector.

For green businesses, consider partnering with educational institutions to further develop your innovative projects. Brainstorming with students in green programs can help you refine your inventions and determine the best methods to expanding your practices; it also gives students a chance to explore the real-world applications of green innovations. **Palette Skills**, a national training provider with a focus on agritech, advanced manufacturing biomanufacturing, and clean technology, can also support in upskilling current and future staff through financial incentives and training program development assistance.

For Jobseekers

Research Green Roles

As the green industry expands over the next few years, jobseekers will be presented with more opportunities for employment. If the green sector is something that appeals to you, start researching pathways to jobs that match your skillset, experience, or interests. No matter what your educational or experiential background, remember that green jobs exist everywhere, and they span across multiple industries, so if you're interested in the sector, there are multiple ways to apply yourself. Similarly, if you're a jobseeker looking for any kind of employment, monitoring upcoming green projects and researching the types of jobs that will be needed to support these projects will enable you to further your education or develop skills, helping you to pursue careers that will soon be in-demand.

Develop Your Skills

There are multiple ways to develop your skills if a job in the green sector interests you. Start by researching certifications that will enable you to enter the industry and transfer any existing skills. For example, if you're an electrician, consider taking **Solar PV Installation workshops** so you can enter the industry once it expands. If you're looking for an apprenticeship or student work placement, consider applying for an apprenticeship or co-op program through **ECO Canada** and gain relevant experience in the green sector.

Since every business has the capacity to go green and will inevitably benefit from the transition, try attending seminars and developing your knowledge on the local environment. By expanding your understanding of sustainability practices and transferring that knowledge to your current or future workplace, you demonstrate your value in a new and changing environment.

Volunteer

If you're not sure if a career in the green industry interests you, consider applying for volunteer positions. Volunteer opportunities will give you the chance to determine whether a green job is right for you, in addition to gaining relevant experience in the field and contributing your time to cleaning the environment. The **Essex Region Conservation Authority**, **Ontario Nature**, and **Ontario Streams** are all great resources for local volunteers that want to protect, monitor, and repair Ontario's natural spaces.

Appendix

These industries comprise the green economy in Windsor-Essex, organized by NAICS codes:

- Hydro-electric Power Generation (221111)
- Nuclear Electric Power Generation (221113)
- Other Electric Power Generation (221119)
- Electric Bulk Power Transmission and Control (221121)
- Electric Power Distribution (221122)
- Steam and Air-Conditioning Supply (221330)
- Power Boiler and Heat Exchanger Manufacturing (332410)
- Turbine and Turbine Generator Set Units Manufacturing (333611)
- Power, Distribution, and Specialty Transformer Manufacturing (335311)
- Battery Manufacturing (335910)
- Wiring Device Manufacturing (335930)
- Power and Communication Line and Related Structures Construction (237130)
- Other Heavy and Civil Engineering Construction (237990)
- Electrical Contractors and Other Wiring Installation Contractors (238210)
- Ornamental and Architectural Metal Products Manufacturing (33232)
- Ventilation, Heating, Air-Conditioning, and Commercial Refrigeration Equipment Manufacturing (33341)
- Automobile Manufacturing (336110)
- Light Truck and Utility Vehicle Manufacturing (336120)
- Motor Vehicle Body Manufacturing (336211)
- Motor Vehicle Parts Manufacturing (3363)
- Navigational, Measuring, Electromedical, and Control Instruments Manufacturing (33451)
- Railroad Rolling Stock Manufacturing (336510)
- Electric Lighting Equipment Manufacturing (3351)
- Household Appliance Manufacturing (3352)
- Motor and Generator Manufacturing (335312)
- All Other Electrical Equipment and Component Manufacturing (335990)
- Residential Building Construction (236110)
- Non-residential Building Construction (2362)
- Land Subdivision (237210)
- Finish Carpentry Contractors (238350)
- All Other Specialty Trade Contractors (238990)
- Architectural Services (541310)
- Landscape Architectural Services (541320)
- Drafting Services (541340), Building Inspection Services (541350)
- Environmental consulting services (541620)
- Waste collection (562110)
- Waste treatment and disposal (562210)
- Remediation services (562910)
- Material recovery facilities (562920)
- All other waste management services (562990)

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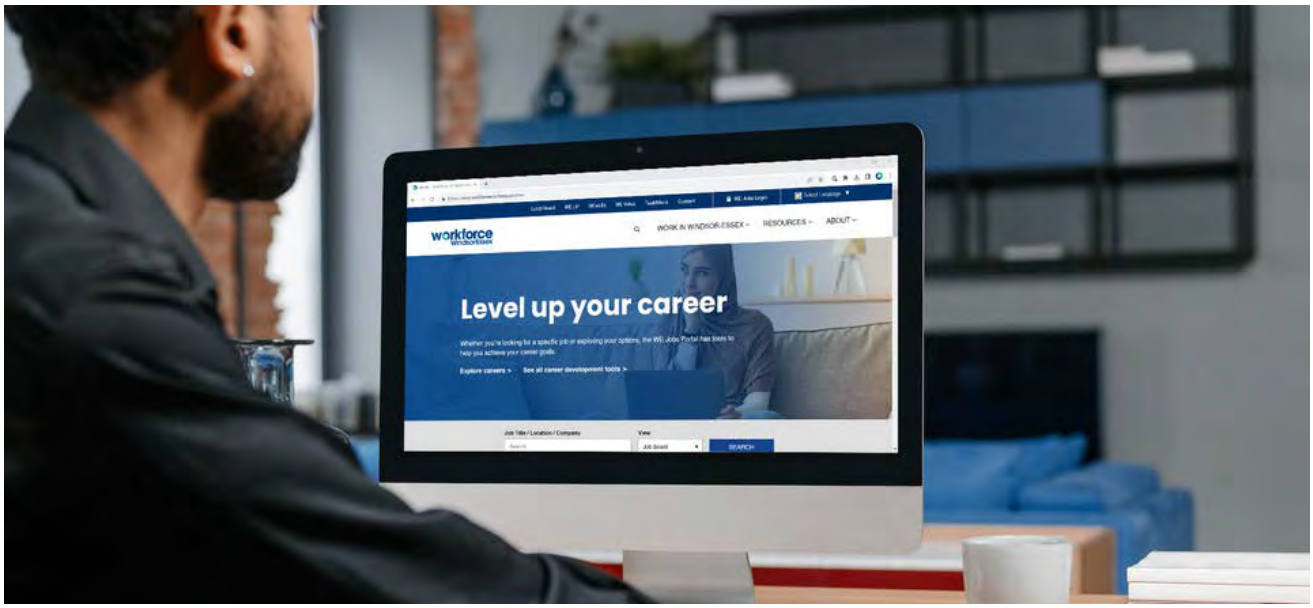

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