

The Emerging Bio Industry in Sarnia Lambton

Bio-industrial technologies are redefining the future of consumer and industrial production. In Sarnia-Lambton, the bio industrial sector is currently an area of great interest to both employers and job seekers. Sarnia-Lambton, once predominantly known for its petrochemical and refining plants, is now evolving into a well-sought after location for emerging bio-industrial companies.



This report will aim to identify the types of jobs that will be created or required by this sector, and the corresponding education, experience and skill sets required to fill these jobs. The Sarnia Lambton Workforce Development Board (SLWDB) obtained the information contained in this report by consulting with local bio industry companies about their current and future workforce needs.

SLWDB thanks the local bio-industrial businesses who provided their time and expertise in order to help inform this report.

Stay up-to-date on local labour market information:

- Sign up for SLWDB's emails at www.slwdb.org
- Follow us on twitter
- Like us on Facebook



www.slwdb.org
(519) 332-0000



This project is funded in part by the Government of Canada and the Government of Ontario.

March 2019

The views expressed in this report do not necessarily reflect those of the Province.

Bio-industrial Enterprises in Sarnia Lambton

The bio sector includes all businesses and organizations that work to convert renewable resources derived from plants and waste into fuels, chemicals and materials. Each and every day, the bio economy expands and companies develop new and innovative ways to convert renewal resources into usable products. As companies continue to develop new processes, commercialization and production will expand. They will require a skilled workforce to meet the needs for future growth.

The emerging bio-industrial sector has been identified as an important area of growth for Sarnia Lambton. As Matthew Slotwinski of the Sarnia Lambton Economic Partnership (SLEP) explained, “not only do we have existing infrastructure, we have an existing labor force with petrochemical skills that are transferable to the bio-industry.”¹

The following bio-industrial companies are currently located in Sarnia-Lambton:

- Advanced Chemical Technologies
- ARLANXEO
- Benefuel
- BIOX
- Comet Biorefining
- Forge Hydrocarbons
- NOVA Chemicals (ethylene production site in St. Clair Township)
- Origin Materials
- Suncor Energy Products - St. Clair Ethanol Plant
- The Cellulosic Sugar Producers Co-operative
- Woodland Biofuels Inc.

Please note that this list is comprehensive at the time of publication; however, it is subject to change.

Many potential sites exist in Sarnia Lambton for future bio-industrial development. There are also sites that have already been developed and are currently available for purchase, including Arlanxco’s Bio-Industrial Park and TransAlta’s Bluewater Energy Park.

Some examples of the work that these businesses are undertaking includes:²

Woodland Biofuels

- \$12 million demonstration plant
- Produces 2,400 metric tons of cellulosic ethanol from wood per year

BIOX

- Former Methes Energy facility
- Converted to a biodiesel facility capable of producing 50 million litres per year

¹ Cathy Dobson, “Not just talk anymore, Sarnia’s bio-industry is for real” in **The Sarnia Journal** (8 January 2018), <http://thesarniajournal.ca/not-just-talk-anymore-sarnias-bio-industry-is-for-real/>

² This information comes from consultations with local bio businesses.

Suncor Ethanol

- In operation since 2006
- Canada's largest ethanol facility
- Produces 400 million litres of ethanol per year
- Uses 40 million bushels of corn annually (20% of Ontario's corn crop)
- Employs 63 full-time staff

Forge Hydrocarbon

- This is a proposed \$25 million project
- Announced that the facility will sit on the BIOX biodiesel facility site
- Capable of producing 25 million litres of renewable diesel per year

Origin Materials

- Facility under Construction at Bio-Industrial Park Sarnia (ARLANXEO)
- Capable of producing 15,000 tons of bio-chemicals per year - demonstration-scale facility
- The Main product will be bio-PET which will be used in partnership with Danone and Nestle Waters
- Plan to be operational in 2019
- Also purchased a \$6 million facility from Eastman Chemicals – a pilot oxidation facility at the Western Sarnia-Lambton Research Park

Benefuel Inc.

- Announced facility at the Bio-Industrial Park Sarnia (ARLANXEO) – land being cleared
- Capable of producing 75 million litres of biodiesel per year
- Construction completed by 2020
- Will employ 40 workers

Advanced Chemical Technologies (AChT)

- Announced project at the Bluewater Energy Park (TransAlta)
- Facility will produce methanol using carbon dioxide emissions from neighbouring industry (i.e. TransAlta Cogen)
- Will be a commercial-scale demonstration plant producing up to 250 tons of methanol per day
- Next stage facility will employ up to 100 workers

LCY Biosciences (partner with Visolis)

- Located at the Bio-Industrial Park Sarnia (ARLANXEO)
- Facility originally built for BioAmber in 2015
- Facility originally had 60 workers producing bio-succinic acid from dextrose
- Had a capacity of 30,000 metric tons per year
- LCY Biosciences purchased the facility in 2018
- Currently exploring new products and processes for the facility, but will continue to produce bio-succinic acid

Comet Biorefining

- Announced facility at the Bluewater Energy Park (TransAlta)
- Facility is proposed to produce 60 million pounds per year of cellulosic sugars (dextrose) and hemicellulose extract from agricultural residues (corn stover and wheat straw)
- Facility will be part-owned by the local Cellulosic Sugar Producers Co-op which is made up of local farmers who will supply feedstock

The Bio Industry Labour Market

Local partners have indicated through surveys and consultations that the skills required closely align with those already being used by the existing petrochemical sector, and that existing industry can easily support this growing sector. The local workforce has the required education, experience and skill sets needed to fill the necessary jobs. It is estimated that in the next ten years, approximately thirty to sixty people will be needed to fill a wide variety of jobs. In addition, an estimated 150 to 200 contractors will also be needed.

Development and growth within the bio-industrial sector in Sarnia-Lambton will undoubtedly have a positive effect on the local labour market. A wide variety of roles within both government and industry will need to be filled, ranging from administrative and finance to maintenance and production jobs. The table below highlights some of the jobs that are relevant to the sector and the subsequent education and experience that will be required to fill the roles.

Job Titles and Required Education in the Bio Industry in Sarnia Lambton

Job title	Education
Analytical technician	BSc in Chemistry or related
Chemical analyst Chemistry analyst	Chemical or biochemical engineering technology diploma or related (college) -or- BSc in Chemistry
Chemical engineer	Chemical engineer (P. Eng.)
Control system technician	Instrumentation and Control Engineering Technology (ICET) college diploma
Instrument designer Instrument technician Instrument technologist	Instrumentation and Control Engineering Technology (ICET) college diploma
Mechanical engineer	Mechanical engineer (P. Eng.)
Mechanical technician	Millwright Mechanical Technician (MTIM) college diploma and/or apprenticeship
Millwright technician	Millwright Mechanical Technician (MTIM) college diploma and/or apprenticeship
Operations leader	Engineer OR (see experience) ³
Plant operator or process operator	Chemical Production and Power Engineering Technology (CPET) college diploma ⁴

³ Previous experience as a Manufacturing supervisor.

⁴ Previous experience working in the chemical industry.

	-or- Advanced Power Engineering (to help pass 2 nd Class Operating [stationary] Engineers exam) ⁵
Production plant manager	Same as required for Production engineer or Operation leader, plus work experience
Project manager	Engineer (P. Eng.)

Education and Training for the Bio Industry

The partners surveyed for this report noted that almost all of the jobs in the bio sector require post-secondary education as well as specialized certification and/or training.

All of the partners also mentioned the proximity to Lambton College, as well as the petrochemical and other bio-industrial companies. They also noted the value of the College’s programs in producing educated, qualified and well-trained employees. The College has solidified its reputation on a provincial and national level, with programming that is innovative and relevant, and that supports the needs of both employers and job seekers in this emerging sector.

Lambton College currently provides students with the necessary education and training to obtain the aforementioned job titles through the following programs:

- Advanced Power Engineering (PEII) program
- Chemical Production & Power Engineering Technology (CPET) program
- Instrumentation and Control Engineering Technology (ICET) program
- Millwright Mechanical Technician (MTIM) program

These programs provide advanced level training through theoretical and practical education.

In addition, Lambton College has recently developed two programs for fall 2019: the Chemical Lab Technician (CLAB) program and the Power Engineering Techniques (PETQ) program. Upon completion of these technician programs, graduates have the option of entering the workforce or taking an advanced diploma to improve their qualifications and job prospects.

Lambton College established the Centre of Excellence in Energy & Bio-Industrial Technologies in 2015. The Centre aims to be an active, integral part of the community, engage with industry, establish new partnerships and offer innovative programming. It offers education and training for students and is also a site of applied research. As Lambton College President and CEO Judith Morris explained, “The Centre has allowed us to ensure our region can meet the skills demanded by this emerging industry. Evolving teaching methodologies coupled with industry-supported work integrated learning or ‘applied learning’ results in the provision of highly qualified personnel for the future of the industry.”⁶ In fall 2018, Lambton College completed an expansion

⁵ Previous experience includes CPET program providers Third Class (PET-C) ticket. With experience, plant operators can take the 2nd Class Operating [stationary] Engineers exam.

⁶ “A Message from Judith Morris, President & CEO, Lambton College - Subject: Successful Establishment of Bio Cluster a Result of Leadership, Innovation and Community Collaboration,” **Lambton College website**, <https://www.lambtoncollege.ca/custom/pages/news/Article.aspx?id=2147520787>

project at the Centre of Excellence, including a renovation of the building and research labs and an update to the programming offered.

The Centre of Excellence also houses the Bluewater Technology Access Centre (BTAC), a specialized research and development centre that provides access to the latest technology, expertise and equipment to help companies solve problems through research. It is focused primarily on helping small and medium-sized companies (SMEs). BTAC assists SMEs who would not otherwise have the resources to take on research projects, but who are interested in partnering with the Centre to improve their products and processes.

The Future Development of the Bio Industry

The bio industry is just beginning to develop. Emerging sectors, unlike traditional or established ones, tend to be more variable and therefore more exposed to even small shifts in the economy or business environment. It is important to understand that this is a natural part of how sectors and industries develop and that these shifts can also be felt by the workforce.

BioAmber was established in 2008 in New Jersey to develop and commercialize succinic acid. In 2015 they opened a plant in Sarnia that employed 60 people. They raised \$200 million to launch the commercial facility, but they required further capital to continue operations. When they couldn't secure it, BioAmber declared bankruptcy. As Sandy Marshall, the executive director of Bioindustrial Innovation Canada, explained, "They needed another fusion of investment and they just couldn't get it."⁷ Many partners surveyed for this report noted that BioAmber's experience was unique and that this does not reflect on the industry as a whole.

As in almost all emerging sectors, demonstration and small commercialization plants are established to refine processes and develop customers and supply chains. Over time, the success of these demonstration plants leads to the development of larger commercial operations. These developments are very significant for Sarnia Lambton as diversification of the economy leads to greater stability and long-term growth and prosperity. According to Baoling Chen of Lambton College, "this cluster merges and builds on the strengths of the hydrocarbon-based and bio-based economies as well as agriculture sector in order to diversify the regional economy."⁸

In fact, according to the partners surveyed for this report, including the Sarnia Lambton Economic Partnership (SLEP), companies are choosing to relocate to Sarnia-Lambton due to the proximity to the agricultural and the petrochemical sectors. Of immense value as well is the development of the Sustainable Chemical Alliance, Bioindustrial Innovation Canada and the Western Research Park in the area. The connection to Lambton College and the existing workforce, comprised of skilled labour, are also key factors.

Concluding Remarks

In summary, the emerging bio industrial sector in Sarnia has contributed to the economic development of the province of Ontario. Sarnia-Lambton's existing workforce, and its existing connection to the petrochemical industry, places it on the map for future growth in this developing field.

⁷ Pam Wright, "Fledgling industry unfazed by BioAmber collapse" in **The Sarnia Journal** (13 August 2018) <http://thesarniajournal.ca/fledgling-industry-unfazed-by-bioamber-collapse/>

⁸ Baoling Chen, "Lambton College research centre helps build biochemical industry in Ontario" in **Canadian BioMass Magazine** (21 February 2019), pp. 1.

**Please give us your feedback on this report
by answering a 5-question survey.**

Survey link: <https://www.surveymonkey.com/r/SS7DSG5>

Thank you!