



Sectoral Profile

Chemical Manufacturing

Ontario

2016-2018



Sectoral Profiles provide an overview of recent labour market developments and outlooks for some of the key industries in various regions of the country

MODERATE GROWTH AMID SOME UNCERTAINTY

- Employment in the chemical manufacturing sector has declined over the last decade but modest growth is expected in the 2016-2018 period.
- Manufacturing sales and exports in this sector have been growing steadily in the post-recession period.
- The sector should see some growth as the pharmaceutical and medicine manufacturing subsector, the largest contributor to employment and sales for this sector, continues to gain new investments and expands to newer markets and products.
- As an export intensive sector, the chemical manufacturing industry will be particularly vulnerable to uncertainty in oil prices, volatility in exchange rates, and unpredictability of trade relationships.
- The future health of the sector will depend on its potential to remain competitive while navigating environmental regulations and high energy prices.

Ontario has the largest chemical manufacturing sector in Canada accounting for over 40% of the nation's total employment¹ and about 40% of total production² for this sector. While the Windsor-Sarnia region has the most concentrated chemicals cluster in the country, over half of the provincial workforce for this sector is located in the Toronto Economic Region (ER).

This sector is composed of seven subsectors: 1) Basic chemical manufacturing, 2) Resin, synthetic rubber, and artificial and synthetic fibres and filaments manufacturing, 3) Pesticide, fertilizer and other agricultural chemical manufacturing, 4) Pharmaceutical and medicine manufacturing, 5) Paint, coating and adhesive manufacturing, 6) Soap, cleaning compound and toilet preparation manufacturing, and 7) Other chemical manufacturing. Pharmaceutical and medicine manufacturing forms the largest subsector, making up about a third of employment³ and accounting for more than 40% of the GDP for the sector.⁴

¹ Statistics Canada, Labour Force Survey

² Invest in Ontario. Chemical/Biochemical. Retrieved March 3 2017 from <https://www.investinontario.com/chemical-and-biochemical>

³ Statistics Canada, CANSIM 281-0024

⁴ Statistics Canada, CANSIM 379-0030, GDP at basic prices by NAICS, provinces and territories annual, 2007 chained dollars

As a value-added, energy intensive, and export intensive sector, chemical manufacturing is sensitive to fluctuations in energy prices, instability in exchange rates, and uncertainty in trade relations.

Employment should remain stable over the forecast period

Employment in the chemical manufacturing sector peaked in 2003 and has seen an overall decline over the past decade. According to the Labour Force Survey, employment fell by 4,100 (-9%) in the sector in 2015. However, the Survey of Employment Payrolls and Hours reported job gains of 3,353 in the sector during the same period.

As a high productivity sector, a greater proportion of its jobs tend to be concentrated at the upper end of the global value chain.⁵ As a result, the sector includes a diverse array of workers with higher skills, training, and education levels that are suited to the operation of the complex and specialized equipment, processes, and technologies.⁶

Some of the key occupations in the chemical manufacturing sector include⁷:

- Chemical plant machine operators (NOC 9421)
- Petroleum, gas and chemical process operators (NOC 9232)
- Chemical technologists and technicians (NOC 2211)
- Other labourers in processing, manufacturing and utilities (NOC 9619)
- Chemists (NOC 2112)
- Manufacturing managers (NOC 0911)

Some gains in employment may be observed as subsectors with the greatest proportion of workers (e.g. pharmaceuticals, soap and cleaning compounds, and other chemical product manufacturing) continue to show gains in sales. However, growth may be moderated by recent sales declines in subsectors that account for close to half of the sector's sales (e.g. basic chemical manufacturing and resin, synthetic rubber, and artificial and synthetic fibres and filaments manufacturing).⁸

This sector includes diverse subsectors that not only produce end-use products but also add value to raw resources creating intermediate products that are used as inputs within the sector and by several other sectors.⁹ As a result, demand or supply fluctuations in other sectors can affect the health and growth of chemical manufacturing. Industries such as automotive manufacturing, food and beverage manufacturing, and aerospace parts manufacturing, are expected to remain steady in the short term which should bode well for this sector. On the other hand, the construction industry is expected to continue to see a slowdown over the latter half of the forecast period which may affect demand for some chemical manufacturing subsectors.

Growth in the pharmaceutical and medicine manufacturing subsector should support employment

The pharmaceutical and medicine manufacturing subsector is a significant contributor to the chemical manufacturing sector, accounting for about a third of its workers¹⁰ and about a quarter of its sales.¹¹ This

⁵ Oschinsky, M., and Chan, K. (2014, February). Ontario Made-Rethinking Manufacturing in the 21st Century- Full Report. *Mowat Centre*. Retrieved from https://mowatcentre.ca/wp-content/uploads/publications/84_ontario_made_full.pdf

⁶ Business and Economics Division. (2016). 2015 Statistical Review. *Chemistry Industry Association of Canada*. Retrieved from

⁷ Custom NHS 2011 data (NOC 9232- 7%; NOC 9421- 7%; NOC 2211- 6%; NOC 9619- 6%; NOC 2112- 5%; NOC 0911- 5%)

⁸ CANSIM 304-0015 Manufacturing Sales, by NAICS and province, monthly (annual total, seasonally unadjusted).

⁹ Innovation, Science, and Economic Development Canada. (2011). Chemicals and chemical products (Total). *Government of Canada*. Retrieved from <https://www.ic.gc.ca/eic/site/chemicals-chimiques.nsf/eng/bt01270.html>

¹⁰ Statistics Canada. CANSIM 281-0024: Survey of Employment, Payrolls, and Hours (SEPH), employment by type and detailed NAICS.

¹¹ CANSIM 304-0015 Manufacturing Sales, by NAICS and province, monthly (annual total, seasonally unadjusted)

subsector has seen an overall growth in employment over the last decade with some decline being observed since 2014. Employment should remain steady over the forecast period as sales of pharmaceutical products have been increasing over the last few years with 2015 registering over \$5 billion in sales for Ontario, the highest the subsector has seen since 2010.¹²

This subsector is poised for growth over and beyond the forecast period due to a number of recent developments. Canada saw a 9.5% increase in sales of patented drugs between 2014 and 2015, which has been attributed to the rise in quantity of existing drug products sold as well as the strong sales of new drugs.¹³ The generic drug market has seen a similar appreciation in sales as generics share of drug spending increases, patents on commonly used drugs expire, and governments try to control health care spending in the face of an aging population and increasing prevalence of chronic diseases.¹⁴ This trend is expected to continue as patented drug and generic drug sales are forecasted to grow in the coming years.¹⁵ As Ontario accounts for the largest share of pharmaceutical companies in Canada,¹⁶ it stands to benefit significantly from this growth.

The increasing adoption of business models that rely on outsourcing of manufacturing to contract service providers (CSPs) offers another avenue of growth for the pharmaceutical manufacturing industry especially due to its proximity to markets in North America.¹⁷ The presence of major CSPs in Ontario, such as Patheon, Dalton Pharma Services, and Contract Pharmaceuticals,^{18,19} could benefit the job market for this sub-sector.

Biopharmaceuticals (or biologics) are forming an increasing share of the pharmaceutical market in terms of sales and adoption and are driving market growth globally and nationally²⁰ particularly due to the increasing prevalence and incidence of auto-immune diseases, cancer, AIDS and other diseases. Biopharmaceuticals are thus forming a potential area for growth for this subsector. Growth could be further strengthened through the expected boom in the biosimilars market following the loss of patent protection for several biopharmaceuticals between 2012- 2019.²¹ This should also boost CSPs as the production of biosimilars may be outsourced.²²

The Access to Cannabis for Medical Purposes Regulations (ACMPR) could provide a new area for growth and investment for this subsector. Companies approved by Health Canada are already engaged in the production of

¹² CANSIM 304-0015 Manufacturing Sales, by NAICS and province, monthly (annual total, seasonally unadjusted)

¹³ Patented Medicine Prices Review Board. (2016, July 29). Annual Report 2015. *Patented Medicines Prices Review Board*. Retrieved from http://www.pmprb-cepmb.gc.ca/CMFiles/Publications/Annual%20Reports/2015/2015_Annual_Report_Final_EN.pdf

¹⁴ Canadian Institute for Health Information. (2015). Prescribed Drug Spending in Canada 2013:Public Drug Programs. Ottawa, ON: CIHI.

¹⁵ International Trade Administration. (2016). 2016 Top Markets Report Pharmaceuticals Country Case Study. *U.S. Department of Commerce*. Retrieved from www.trade.gov/topmarkets

¹⁶ Invest in Ontario. (2014). Pharmaceuticals. *Invest in Ontario*. Retrieved from <http://www.investinontario.com/pharmaceuticals>

¹⁷ IMS Brogan. (2013). Canada's Pharmaceutical Industry and Prospects. *Industry Canada*. Retrieved from <https://www.ic.gc.ca/eic/site/lsg-pdsv.nsf/eng/hn01768.html>

¹⁸ McCoy, M., Thayer, A.M., and Mullin, R. (2016, April 4). Three stories of pharmaceutical outsourcing. *Chemical and Engineering News*. Retrieved from <http://cen.acs.org/articles/94/i14/Three-stories-pharmaceutical-outsourcing.html>

¹⁹ Federal Economic Development Agency for Southern Ontario. (2015, May 29). Harper Government Announces Support for Life Sciences Manufacturer in Mississauga. *Government of Canada News Releases*. Retrieved from <http://news.gc.ca/web/article-en.do?mthd=advSrch&crtr.mnthndVl=&crtr.mnthStrtVl=&crtr.page=1&nid=981269&crtr.yrndVl=&crtr.kw=mississauga&crtr.yrStrtVl=&crtr.dyStrtVl=&crtr.dyndVl=>

²⁰ Dawson, L. (2016, July 15). The Critical Role of Biopharmaceuticals in Canadian Health and Economic Growth: Laura Dawson for Inside Policy. *Macdonald-Laurier Institute*. Retrieved from <http://www.macdonaldlaurier.ca/the-critical-role-of-biopharmaceuticals-in-canadian-health-and-economic-growth-laura-dawson-for-inside-policy/>

²¹ IMS Brogan. (2013). Canada's Pharmaceutical Industry and Prospects. *Industry Canada*. Retrieved from <https://www.ic.gc.ca/eic/site/lsg-pdsv.nsf/eng/hn01768.html>

²² Industry Standard Research. (2016, May 17). Two-Thirds of Biopharma Sponsors Surveyed Currently Sell or Plan to Sell Biosimilar Products. *Marketwired*. Retrieved from <http://www.marketwired.com/press-release/two-thirds-biopharma-sponsors-surveyed-currently-sell-plan-sell-biosimilar-products-2125816.htm>

cannabis related drugs and the industry is set to expand in the near future.²³ Recent investments in medical marijuana production across the province include a variety of new production facilities^{24,25,26} and company expansions^{27,28} which are expected to create additional opportunities in the subsector over the forecast period.

The establishment of the Canada and European Union (EU) Comprehensive Economic and Trade Agreement (CETA) and subsequent elimination of tariffs on exports also bodes well for this subsector. The patent term restoration provision for pharmaceuticals under CETA could boost generic drug manufacturing by harmonizing Canada's patent system with that of major trading partners.²⁹ However, the extension on patent terms could slow growth for the subsector by delaying the entry of generic medicines into the market by up to two years.³⁰

The Affordable and Safe Prescription Drug Importation Act, recently introduced in the US Senate, calls to amend the Federal Food, Drug, and Cosmetic Act to allow for the importation of qualifying prescription drugs from Canadian sellers and other advanced countries to lower drug prices in the US.³¹ If passed, the Bill may have a positive impact on exports of Canadian pharmaceuticals. However, the potential for a negative change to the US-Canada trade relationship could offset some of the gains from increased exports.

Growth of this subsector may be tempered by external factors such as increased growth in developing and emerging markets which shifts investment away from developed markets like Canada; lagging market attractiveness of Canada in terms of pricing controls, market access, regulatory requirements; loss of exclusivity of patent products; dearth of new blockbuster drugs; slowing product approvals; efforts to contain costs from payers driving down drug prices; restrictive market access for generic and patent drugs; and uncertainty in drug pricing and FDA user fee programs in the US under the new administration.^{32,33,34,35}

²³ Uddin, A., and Gilmer, N. (2016, April 8). As High as the Rockies- The Canadian Marijuana Opportunity. *Mackie Research Capital Corporation*. Retrieved from http://www.theglobeandmail.com/globe-investor/investment-ideas/research-reports/article29573050.ece/BINARY/Medical%20Marijuana_4-8-2016.pdf

²⁴ Huntsville Forester. (2016, May 16). Marijuana production facility officially coming to Huntsville. *Huntsville Forester*. Retrieved from <http://www.muskokaregion.com/news-story/6557027-marijuana-production-facility-officially-coming-to-huntsville/>

²⁵ Langlois, D. (2015, April 1). Medical marijuana production facility to cost \$14M. *Owen Sound Sun Times*. Retrieved from <http://www.owensoundsuntimes.com/2015/04/01/medical-marijuana-production-facility-to-cost-14m>

²⁶ Patterson, T. AMMCan earns license to grow test medical marihuana batches at Kincardine greenhouses. *Kincardine News and Lucknow Sentinel*. Retrieved from <http://www.goderichsignalstar.com/2016/03/14/ammc-can-earns-license-to-grow-test-medical-marihuana-batches-at-kincardine-greenhouses>

²⁷ Thorne, L. (2015, March 18). Medical Marijuana Facility in Leamington to Expand. *WindsoriteDotCaNews*. Retrieved from <http://windsorite.ca/2015/03/medical-marijuana-facility-in-leamington-to-expand>

²⁸ Coles, P. (2015, October 7). NOTL marijuana facility licensed to become largest in Canada. *Niagara Advance*. Retrieved from <http://www.niagaraadvance.ca/2015/10/07/notl-marijuana-facility-licensed-to-become-largest-in-canada>

²⁹ Ling, J. (2014). CETA's patent protections. *CBA/ABC National Magazine*. Retrieved from <http://www.nationalmagazine.ca/Articles/Fall-issue-2014/A-bumpy-road-for-Canada-EU-trade-deal.aspx>

³⁰ Keon, J. (2013, October 18). Canadian Generic Pharmaceutical Association Statement Regarding Agreement in Principle in CETA Negotiations. *Canadian Generic Pharmaceutical Association*. Retrieved from http://canadiangenerics.ca/news-release3/oct_18_13/#

³¹ Bivens, J. (2017, February 28). The Affordable and Safe Prescription Drug Importation Act. *Economic Policy Institute*. Retrieved from <http://www.epi.org/blog/the-affordable-and-safe-prescription-drug-importation-act-is-what-real-health-reform-looks-like/>

³² Canadian Institute for Health Information. (2015). Prescribed Drug Spending in Canada 2013: Public Drug Programs. Ottawa, ON: CIHI.

³³ Persistence Market Research. (2016, November 26). Pharmaceutical outsourcing market is progressing towards a strong growth by 2024. *Medgadget*. Retrieved from <http://www.medgadget.com/2016/11/pharmaceutical-outsourcing-market-is-progressing-towards-a-strong-growth-by-2024.html>

³⁴ Daurat, C., and Olorunnipa, T. (2017, February 7). Trump sinks pharma stocks on Medicare drug price negotiation. *Bloomberg*. Retrieved from <https://www.bloomberg.com/news/articles/2017-02-07/trump-backs-medicare-drug-price-negotiating-spicer-says>

³⁵ Brennan, Z. (2017, March 16). Trump FY 2018 Budget: Hike in FDA User Fees? *Regulatory Affairs Professionals Society*. Retrieved from <http://www.raps.org/Regulatory-Focus/News/2017/03/16/27127/Trump-FY-2018-Budget-Blueprint-Hike-in-FDA-User-Fees/>

An export-intensive sector sensitive to changes in trade relationships

In 2016, Ontario exported over \$21 billion worth of chemicals and chemical products, an increase of about 4% from 2015, accounting for over half of all Canadian exports from this sector.³⁶ As an export intensive sector, the performance of the chemical manufacturing sector is closely linked to exchange rate fluctuations³⁷ and the operation of free trade agreements.

The United States is Ontario's main export market for this sector with over three quarters of its exports going to the US in 2016.³⁸ The North American Free Trade Agreement (NAFTA) has greatly benefitted this sector by lowering the cost of production, increasing economic activity, and bolstering the sector's relevance in the North American manufacturing economy.³⁹ However, the new US administration's protectionist policies, particularly aimed at the manufacturing sector, and potential renegotiations of NAFTA may create some uncertainty for this sector over the forecast period. If additional tariffs are imposed and labour outsourcing is reduced or eliminated, the sector could see reduced new investments and exports. Also, major multinationals in the sector may relocate to the US to take advantage of more favourable regulatory, tax, and trade policies offered by the new administration.^{40,41} The chemical manufacturing sector may also face some indirect impacts as industries using chemical goods see a slowdown in sales and exports in the face of US protectionist policies. Uncertainties in the trade relationship with the US could affect employment over the forecast period.

In 2016, the European Union (EU) accounted for about 10% of exports from Ontario's chemical manufacturing sector.⁴² EU tariffs on chemical products will be eliminated immediately upon CETA's entry into force which could enhance the competitiveness of the sector and potentially increase sales over the forecast period.⁴³ CETA could also boost Foreign Direct Investment, potentially increasing investments in this sector.⁴⁴

On January 1, 2015, the Canada-Korea Free Trade Agreement (CKFTA) entered into force giving Canadian exporters preferential access to the South Korean market and the potential to expand Canadian business in emerging markets in the Asia-Pacific region. The chemical manufacturing industry has benefitted from the CKFTA through the elimination/reduction of tariffs on several Canadian chemical products, pharmaceutical, and

³⁶ Trade Data Online. Canadian Total Exports, Distribution by Province, NAICS 325- Chemical Manufacturing, All Countries. *Industry Canada*. Retrieved March 1, 2017 from <https://www.ic.gc.ca/eic/site/tdo-dcd.nsf/eng/Home>

³⁷ Oschinsky, M., and Chan, K. (2014, February). Ontario Made-Rethinking Manufacturing in the 21st Century- Full Report. *Mowat Centre*. Retrieved from https://mowatcentre.ca/wp-content/uploads/publications/84_ontario_made_full.pdf

³⁸ Trade Data Online. Canadian Total Exports, Ontario, NAICS 325- Chemical Manufacturing, United States. *Industry Canada*. Retrieved March 1, 2017 from <https://www.ic.gc.ca/eic/site/tdo-dcd.nsf/eng/Home>

³⁹ Chemistry Industry Association of Canada (CIAC), American Chemistry Council (ACC), and Asociación Nacional de la Industria Química (ANIQ). (2017, March 1). The North American Chemical Industry & NAFTA. *Chemistry Industry Association of Canada*. Retrieved from http://www.canadianchemistry.ca/library/uploads/NAFTA_and_the_North_American_Chemical_Industry.pdf

⁴⁰ Hirschfeld Davis, J. (2017, February 23). Trump Turns to Manufacturing Executives to Help Develop Job Plans. *The New York Times*. Retrieved from https://www.nytimes.com/2017/02/23/us/politics/trump-manufacturing.html?_r=1

⁴¹ Hodges, P. (2017, January 23). Trump policy to impact global supply chains, US stock markets. *ICIS*. Retrieved from <http://www.icis.com/blogs/chemicals-and-the-economy/2017/01/trump-policies-to-impact-global-supply-chains-us-stock-markets/>

⁴² Trade Data Online. Canadian Total Exports, Ontario, NAICS 325- Chemical Manufacturing, European Union (detailed). *Industry Canada*. Retrieved March 1, 2017 from <https://www.ic.gc.ca/eic/site/tdo-dcd.nsf/eng/Home>

⁴³ Global Affairs Canada. How CETA Will Benefit Ontario. *Government of Canada*. Retrieved from http://www.international.gc.ca/trade-agreements-accords-commerciaux/assets/pdfs/ceta-aecg/provincial_ON_eng.pdf

⁴⁴ Cooper, L. (2016). The Comprehensive Economic and Trade Agreement: A 2016 Update. *RBC Economics*. Retrieved from <http://www.rbc.com/economics/economic-reports/pdf/other-reports/CETA%20update.pdf>

cosmetics exports in 2015. Since CKFTA, Ontario has seen significant export gains⁴⁵ with the chemical manufacturing sector posting \$138 million in exports to South Korea in 2016, an almost 16% gain since 2014.⁴⁶

These agreements could also benefit the chemical manufacturing sector indirectly by enhancing the sales, exports, and competitiveness of several key industries that use chemical goods. For instance, CETA and CKFTA tariff and duties eliminations are expected to boost oil and gas, agriculture, industrial products, plastics, and automotive industries by increasing their exports and making them more competitive in these markets.^{47,48} In addition, CETA's provisions, for sub-national procurement, that allow Canada to bid on public contracts in Europe and vice-versa, could further boost Canadian industries such as construction, transportation, and aerospace manufacturing. Gains in these industries should contribute to growth in chemical manufacturing through increased demand.

Environmental regulations could affect competitiveness of the sector

Recent efforts to reduce carbon emissions through the cap-and-trade program are anticipated to impact energy intensive sectors and emission intensive and trade exposed (EITE) industries which could face competitiveness pressures from other jurisdictions that do not have similar plans. Chemical manufacturing (specifically basic chemicals, petrochemicals, synthetic fibres, and fertilizers subsectors), an EITE industry, is expected to be particularly vulnerable in this regard.^{49,50} Additionally, potential actions by the new US administration to curtail the Clean Power Plan, could further reduce the prospects of advancing a similar plan south of the border.⁵¹ As Ontario's main trading partner for this sector, this could potentially affect the competitiveness of local firms in relation to their US counterparts who may not be subject to carbon pricing or emission limits. However, some of Ontario's largest companies will receive major exemptions and given free allocations for the first four years of the program which may offset some competitiveness pressures.⁵²

The Auditor General of Ontario recently recommended updating the Environmental Assessment Act to ensure both public and private sector projects that could potentially have significant negative impacts, undergo an environmental assessment. These recommendations could increase some costs for the sector and potentially affect its competitiveness in relation to the US which is seen to be creating a more favourable regulatory environment for investment.⁵³ However, the inclusion of the private sector in the Act is being considered for long term improvements to the legislation and is not expected to take effect in the near future.

⁴⁵ Global Affairs Canada. (2016). Export gains since the CKFTA's entry into force. *Government of Canada*. Retrieved from <http://international.gc.ca/trade-agreements-accords-commerciaux/agr-acc/korea-coree/export-gains-exportation.aspx?lang=eng>

⁴⁶ Trade Data Online. Canadian Total Exports, Ontario, NAICS 325- Chemical Manufacturing, All Countries. *Industry Canada*. Retrieved March 9, 2017 from <https://www.ic.gc.ca/eic/site/tdo-dcd.nsf/eng/Home>

⁴⁷ Staff. (2017, February 15). CETA, Canada's trade deal with Europe, moves forward. Now what? *The Globe and Mail*. Retrieved from <http://www.theglobeandmail.com/report-on-business/economy/against-all-odds-ceta-moves-forward-now-what/article34031523/>

⁴⁸ Global Affairs Canada. (2016). Export gains since the CKFTA's entry into force. *Government of Canada*. Retrieved from <http://international.gc.ca/trade-agreements-accords-commerciaux/agr-acc/korea-coree/export-gains-exportation.aspx?lang=eng>

⁴⁹ Dolega, M., and DePratto, B. (2016, December 14). Canada-wide carbon pricing offers opportunities, but is not without risks. *TD Economics*. Retrieved from <https://www.td.com/document/PDF/economics/special/CarbonPricing2016.pdf>

⁵⁰ Beale, E., Beugin, D., Dahlby, B., Drummond, D., Olewiler, N., and Ragan, C. (2015, November). Provincial Carbon Pricing and Competitiveness Pressures. *Canada's Ecofiscal Commission*. Retrieved from <https://www.ecofiscal.ca/wp-content/uploads/2015/11/Ecofiscal-Commission-Carbon-Pricing-Competitiveness-Report-November-2015.pdf>

⁵¹ Valdmanis, R. (2017, March 1). Trump poised to lift federal coal bans, other green rules: White House. *Reuters*. Retrieved from <http://www.reuters.com/article/us-usa-trump-energy-idUSKBN168592>

⁵² The Canadian Press. (2016, December 31). Ontario's electricity is about to get more expensive. *Huffington Post*. Retrieved from http://www.huffingtonpost.ca/2016/12/31/electricity-prices-ontario_n_13916024.html

⁵³ Valdmanis, R. (2017, February 27). Aggressive cutes to Obama-era green rules to start soon: EPA head. *Reuters*. Retrieved from <http://www.reuters.com/article/us-usa-trump-epa-idUSKBN1640S9>

Although there may be potential costs and competitiveness pressures associated with environmental regulations in the short term, businesses committing to greener and more sustainable practices have been found to reduce costs, improve resource productivity and profitability, increase competitiveness, and improve brand loyalty.^{54,55} Thus these changes to environmental regulations may strengthen the sector in the long term.

Affordable energy is key to the growth of the sector

The chemical manufacturing industry is energy intensive requiring large inputs of electricity and feedstocks for production.⁵⁶ Some estimates indicate that feedstock and energy costs constitute about 70% of chemical companies' process costs,⁵⁷ making this industry particularly vulnerable to high energy costs.

Ontario has been found to have some of the highest industrial electricity rates in North America.⁵⁸ These rates have increased by 16% between 2013 and 2015 and are expected to continue to rise over the forecast period as fixed costs increase, demand for energy falls, and additional costs pressures arise from the introduction of the cap-and-trade program and renovation of nuclear power plants.^{59,60} Rising electricity costs in Ontario have been identified as a key concern for this sector⁶¹ as further increase in rates could create a competitive disadvantage in relation to other lower cost jurisdictions, impact future investments in the province, and affect the ability of the sector to grow and provide employment.^{62,63,64} However, the recent expansion of the Industrial Conservation Initiative (ICI), which incentivizes large electricity consumers to move their electricity consumption to off-peak periods thus reducing their bills by about a third, could alleviate energy costs for the sector and support growth.⁶⁵

Both natural gas and crude oil play are important inputs in chemical manufacturing whether as a fuel source or a feedstock⁶⁶. In terms of natural gas, it has proven to be a boon to the sector providing a low-cost input. Key players in the sector are taking advantage of natural gas feedstocks and supporting greater capital investment in the province. For instance, Nova Chemicals is investing \$400 million dollars in upgrading its Corunna plant to

⁵⁴ Porter, M.E., and van der Linde, C. (1995). Green and Competitive: Ending the Stalemate. *Harvard Business Review*. Retrieved from <https://hbr.org/1995/09/green-and-competitive-ending-the-stalemate>

⁵⁵ Zokaei, K. (2013, October 14). Environmentally-business is profitable business. *The Guardian*. Retrieved from <https://www.theguardian.com/sustainable-business/environmentally-friendly-sustainable-business-profitable>

⁵⁶ Statistics Canada. (2016, October 31). Energy consumption by manufacturing sector, 2015. *Statistics Canada*. Retrieved from <http://www.statcan.gc.ca/daily-quotidien/161031/dq161031d-eng.pdf>

⁵⁷ Canadian Plastics. (2016, February 12). The Energy Efficient Chemical Supplier (And How to Become One). *Canadian Plastics*. Retrieved from <http://www.canplastics.com/features/energy-efficient-chemical-supplier-become-one/>

⁵⁸ Association of Major Power Consumers in Ontario. (2015). Benchmarking 2015 Analysis. *AMPCO*. Retrieved from <http://www.ampc.org/index.cfm?pagepath=Analysis/Benchmarking&id=36556>

⁵⁹ Holmes, A. (2015). Empowering Ontario: Constraining Costs and Staying Competitive in the Electricity Market. *Ontario Chamber of Commerce*. Retrieved from <http://www.occ.ca/wp-content/uploads/2013/05/Empowering-Ontario.pdf>

⁶⁰ Association of Major Power Consumers in Ontario. (2015). Benchmarking 2015 Analysis. *AMPCO*. Retrieved from <http://www.ampc.org/index.cfm?pagepath=Analysis/Benchmarking&id=36556>

⁶¹ Chemistry Industry Association of Canada. (2016). Competitiveness Scorecard- Chemical Sector- Ontario 2016-2017. *Chemistry Industry Association of Canada*. Retrieved from https://www.canadianchemistry.ca/library/uploads/ON_Scorecard_Final.pdf

⁶² Holmes, A. (2015). Empowering Ontario: Constraining Costs and Staying Competitive in the Electricity Market. *Ontario Chamber of Commerce*. Retrieved from <http://www.occ.ca/wp-content/uploads/2013/05/Empowering-Ontario.pdf>

⁶³ Cross, P. (2015, October). Ontario - No Longer a Place to Prosper. *Fraser Institute*. Retrieved from <https://www.fraserinstitute.org/sites/default/files/ontario-no-longer-a-place-to-prosper.pdf>

⁶⁴ Canadian Press. (2016, December 20). Toronto company opening US plant due to rising electricity rates. *Toronto Star*. Retrieved from <https://www.thestar.com/business/2016/12/20/toronto-company-opening-us-plant-because-of-rising-ontario-electricity-rates.html>

⁶⁵ Ministry of Energy. (2016, September 15). Ontario's Industrial Conservation Initiative (ICI). *Ontario Newsroom*. Retrieved from <https://news.ontario.ca/mei/en/2016/09/ontarios-industrial-conservation-initiative-ici.html>

⁶⁶ NRCan. Chemical Manufacturing energy use by energy source, 2013 and 2014. *Natural Resources Canada*. Retrieved on March 17 2017 from <http://oee.nrcan.gc.ca/corporate/statistics/neud/dpa/showTable.cfm?type=IC§or=aaa&juris=ca&rn=12&page=1>

create a pipeline to connect to natural gas liquids originating from the US.⁶⁷ However, natural gas prices are expected to increase due to strong demand across North America, falling supply from U.S basins, and the recently introduced cap-and-trade program.⁶⁸ These factors may potentially have negative consequences for the sector over the forecast period by the increasing the cost of input. When it comes to crude oil, an expected recovery could be a double-edged sword for the sector. While increasing oil prices could raise input costs for subsectors dependent on oil feedstocks,^{69,70} the higher prices could increase revenues from petrochemicals and benefit chemical companies supplying oil companies.⁷¹

Growth opportunities manifest in biochemicals and biofuels

The signing of the Paris agreement in 2015 has renewed federal and provincial efforts to reduce carbon emissions and has further supported the burgeoning bioeconomy in Ontario.⁷² This has created new areas for growth, investment, and employment in the chemical manufacturing sector particularly for industries that use biomass to create renewable biochemical and biofuel products. For instance, Bioindustrial Innovation Canada (BIC), established in 2008, has received additional provincial⁷³ and federal funding⁷⁴ to continue to support the bio-based industrial sector and is expected to create additional jobs over the forecast period.

Employment in the chemical manufacturing sector should receive a boost from growth and investment in the biofuel industry as production and use increases in tandem with federal and provincial renewable fuels mandates⁷⁵ and provincially funded programs support the expansion of the biofuel industry.⁷⁶

Efforts to diversify the province's manufacturing base into biochemicals are also providing a promising area for growth and employment.⁷⁷ The recent establishment of new industries in this area are expected to increase employment in the sector. The biochemicals industry should continue to grow as economic and ecological factors drive change and diversification in other industries.⁷⁸ For instance, as the forestry industry seeks to diversify the use of its (by)products, biochemicals may see increases in investment and partnership.⁷⁹

⁶⁷ Morden, P. (2016, March 15). Chemical company planning pipeline, cracker upgrades. *Sarnia Observer*. Retrieved from <http://www.theobserver.ca/2016/03/15/chemical-company-planning-for-pipeline-cracker-upgrades>

⁶⁸ Deloitte. (2016, December 31). Price Forecast. *Deloitte*. Retrieved from https://www2.deloitte.com/content/dam/Deloitte/ca/Documents/energy-resources/ca-en-rea_forecast_2016_12_EN_AODA.PDF

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⁷⁰ Sprenger, D. (2015, June 19). Analysis of Economic Obsolescence: Lubricant Oil, Chemical & Other Plastic Products Manufacturing in Ontario. *Municipal Property Assessment Corporation*. Retrieved from <https://mpac.ca/sites/default/files/imce/pdf/ChemicalEO.pdf>

⁷¹ Chemistry Industry Association of Canada. (2016, December). 2016 Survey of Business Conditions Industrial Chemicals. *Chemistry Industry Association of Canada*. Retrieved from http://www.canadianchemistry.ca/library/uploads/Year_end_report_2016_ea.pdf

⁷² Macklin, A. (2016, February 4). 2016 State of the Industry Report. *Canadian Biomass*. Retrieved from <https://www.canadianbiomassmagazine.ca/news/state-of-the-industry-5500>

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⁷⁴ Federal Economic Development Agency for Southern Ontario. (2016, July 25). Government of Canada Invests \$12M to Support Bio-Based Innovation in Sarnia. *Government of Canada News Releases*. Retrieved from <http://news.gc.ca/web/article-en.do?nid=1103989>

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⁷⁷ Chemistry Industry Association of Canada. (2016). Competitiveness Scorecard: Chemical Sector, Ontario 2016-2017. *Chemistry Industry Association of Canada*. Retrieved from https://canadianchemistry.ca/library/uploads/ON_Scorecard_Final.pdf

⁷⁸ O'Malley, L. (2013, November). Digging in Bio-based Innovation. *MaRs Discovery District*. Retrieved from <https://www.marsdd.com/wp-content/uploads/2014/03/MaRS-Reports-Digging-in-to-Bio-based-Innovation-FINAL.pdf>

⁷⁹ Forestry industry development. *Government of Ontario*. Retrieved from <https://www.ontario.ca/page/forest-industry-development>

Sector Outlook: Modest growth expected for the chemical manufacturing sector

Provincial employment in the chemical manufacturing sector is expected to increase by an annual average of 0.9% over the forecast period. Modest growth is expected over the forecast period due to potential new investments in the province, some increase in exports encouraged by new trade deals, growth in sales for some subsectors and improvement in industries using chemical inputs. Growth may be moderated by volatility in energy prices, exchange rate fluctuations, environmental regulations, and changes in the US administration.

Sub-provincial trends

Ontario's chemical manufacturing sector is concentrated in several regions including Toronto, Windsor-Sarnia, Hamilton- Niagara Peninsula, and parts of Eastern Ontario.

In 2015, the **Toronto** economic region accounted for over half of the province's employment⁸⁰ and more than half of the province's establishments for the chemical manufacturing sector.⁸¹ Toronto also boasts the largest pharmaceutical cluster in both the province and Canada with some of the major global pharmaceutical manufacturing companies operating here.⁸² Recent investments to expand pharmaceutical manufacturing in Toronto includes combined investment from Bayer and Versant Ventures to launch Bluerock Therapeutics,⁸³ federal funding for Contract Pharmaceuticals Ltd Canada,⁸⁴ and provincial funding to Taro Pharmaceuticals.⁸⁵ In combination with growth in the wider life sciences sector in the region,⁸⁶ and increasing pharmaceutical sales⁸⁷ (which accounted for 25% of sales in manufacturing) these investments should continue to support job growth in this sector.

The **Windsor-Sarnia** region is the major hub for the chemical industry with the Sarnia-Lambton area providing the most integrated chemical cluster in the country.⁸⁸ This area is at the center of the burgeoning biochemical and biofuel industry and has seen expansions by major manufacturers including BioAmber Inc.⁸⁹, Comet Biorefining Inc.,⁹⁰ and BIOX Corporation⁹¹ in recent months. In conjunction with investments in other chemical

⁸⁰ Statistics Canada, Labour Force Survey

⁸¹ December 2015 Establishment Counts by ER, NAICS, and Employment Size Ranges

⁸² Impact Consulting Group. (2011). Pharmaceutical Research & Manufacturing in Ontario Sector Analysis. *University of Toronto*. Retrieved from http://www.research.utoronto.ca/wp-content/uploads/2011/10/Ontario_Pharma_Research_Mfg_2012.pdf

⁸³ CNW. (2016, December 12). Bayer and Versant Ventures Join Forces to Launch Stem Cell Therapy Company Bluerock Therapeutics with USD 225 Million Series A Financing. *CNW*. Retrieved from <http://www.newswire.ca/news-releases/bayer-and-versant-ventures-join-forces-to-launch-stem-cell-therapy-company-bluerock-therapeutics-with-usd-225-million-series-a-financing-606003366.html>

⁸⁴ Federal Economic Development Agency for Southern Ontario. (2015, May 29). Harper Government Announces Support for Life Sciences Manufacturer in Mississauga. *Government of Canada News Releases*. Retrieved from <http://news.gc.ca/web/article-en.do?mthd=advSrch&crtr.mnthndVI=&crtr.mnthStrtVI=&crtr.page=1&nid=981269&crtr.yrndVI=&crtr.kw=mississauga&crtr.yrStrtVI=&crtr.dyStrtVI=&crtr.dyndVI=>

⁸⁵ Criscione, P. (2014, April 28). Pharmaceutical company gets cash injection. *Brampton Guardian*. Retrieved from <http://www.bramptonguardian.com/news-story/4488784-pharmaceutical-company-gets-cash-injection/>

⁸⁶ Innovation, Science, and Economic Development Canada. (2016). Federal Government Support. *Government of Canada*. Retrieved from https://www.ic.gc.ca/eic/site/lsg-pdsv.nsf/eng/h_hn01725.html

⁸⁷ Statistics Canada. CANSIM 304-0015 Manufacturing sales, by NAICS and provinces, monthly

⁸⁸ Invest in Ontario. Chemical/Biochemical. Retrieved March 3 2017 from <https://www.investinontario.com/chemical-and-biochemical>

⁸⁹ Michaels, L. (2015, July 13). Bio-Amber Set to Officially Open Next Month. *Blackburnnews.com*. Retrieved from <http://blackburnnews.com/sarnia/sarnia-news/2015/07/13/bio-amber-set-to-officially-open-next-month/>

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⁹¹ Michaels, L. (2016, June 24). Expansion Plans At Newly Sold Methes Energies. *Blackburnnews.com*. Retrieved from <http://blackburnnews.com/sarnia/sarnia-news/2016/06/24/expansion-plans-newly-sold-methes-energies/>

subsectors,^{92,93} the region should see some job growth in this sector. The uncertainty in oil prices over the forecast period may create some instability in the region due to its concentration of petrochemical industries and other industrial chemicals industries that depend on oil feedstocks.

The **Hamilton-Niagara Peninsula** made up about 11% of the provincial chemical manufacturing establishments⁹⁴ and a little less than 10% of employment.⁹⁵ The ongoing recovery of the manufacturing sector in region⁹⁶ and recent investments^{97,98} should provide some employment gains over the forecast period. Proximity to growth in the GTA should assist the regional manufacturing base and support this sector.⁹⁹

Note: In preparing this document, the authors have taken care to provide clients with labour market information that is timely and accurate at the time of publication. Since labour market conditions are dynamic, some of the information presented here may have changed since this document was published. Users are encouraged to also refer to other sources for additional information on the local economy and labour market. Information contained in this document does not necessarily reflect official policies of Employment and Social Development Canada.

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⁹² Business Wire. (2015, June 18). CF Industries to Increase Production of Urea-Based Products at Courtright Nitrogen Complex in Ontario. *Business Wire*. Retrieved from <http://www.businesswire.com/news/home/20150618005965/en/#.VYwjiU3bleg>

⁹³ Kula, T. (2016, October 26). Open house held Wednesday on expansion plans for Nova Chemicals. *Sarnia Observer*. Retrieved from <http://www.theobserver.ca/2016/10/26/open-house-held-wednesday-on-expansion-plans-for-nova-chemicals>

⁹⁴ December 2015 Establishment Counts by ER, NAICS, and Employment Size Ranges

⁹⁵ Statistics Canada, Labour Force Survey

⁹⁶ Canadian Manufacturers and Exporters. (2016). Regional Manufacturing Profile Hamilton-Niagara Region. *Canadian Manufacturers and Exporters*. Retrieved from <http://www.cme-mec.ca/download.php?file=583ld1r2x.pdf>

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