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Edmonton offers strong, dynamic economic fundamentals supporting investment in today’s business sector. The major economic drivers support business and industry expansion for the next decade and beyond.

Edmonton has unique economic advantages and a strong cultural identity, and it offers tremendous opportunity for investors. It cultivates knowledge and innovation, attracts and retains skilled and motivated labour and has the quality infrastructure needed to support industrial and economic development. It is an entrepreneurial city led by an incredible business sector.

Edmonton offers an ideal environment for industrial growth. It has access to natural resources, established industrial and R & D sectors, a highly skilled labour force, and an outstanding transportation network connecting Edmonton to key North American and Asian markets.

Located at the heart of the Alberta Capital Region, it is the supply and service hub to Alberta’s world-class energy sector including the oil sands and natural gas deposits, and is central to Western Canada’s extensive road, rail and pipeline networks.

Edmonton provides industry with a range of industrial neighbourhoods and lands, various incentives to facilitate investment, first rate infrastructure services, low taxes and regulatory requirements that are transparent and straightforward.
EDMONTON PRIMED FOR MORE GROWTH

STRONG, STABLE ECONOMY UNDERPINS CURRENT BUSINESS FUNDAMENTALS

Edmonton’s business and industrial sectors benefit from a strong and stable economy.

Edmonton’s economy has demonstrated its resilience and strength even during uncertain global economic conditions.

Edmonton’s basic business fundamentals add up to a location at the hub of economic activity. These include:

- a younger, motivated, skilled and experienced workforce,
- access to natural resources,
- connections to key North American and Asian markets through an outstanding transportation network; and
- a strong local and regional customer base.

Edmonton is a growing city with economic momentum strong enough to deliver business results today and well into the future.

The 2015 Growth Monitoring Report: Our Growing City announced that Edmonton is growing fast. In just two years, Edmonton has grown by 7.4% or more than 60,000 people. That’s an average of 82 more people in Edmonton every day.¹

Population growth is expected to continue adding to Edmonton’s current population of 899,447.²

Because of weak oil and gas prices Alberta’s economy contracted by 4.0% in 2015. However, Alberta still leads all provinces in economic growth during the past 20 years with an average annual GDP growth of 3.2% per year.³

Alberta’s per capita GDP of $91,183 (in 2014) is the highest of any state or province in North America.⁴

Alberta’s economy is expected to grow again after two very difficult years. While short-term prospects for major investments in the energy sector remain grim despite oil prices gaining ground, the outlook for oil production is positive, with the lower base in 2016 setting up for a stronger rate of increase in 2017 than previously expected.

The rebuilding of Fort McMurray will also contribute to growth next year and beyond.

Builders in the Edmonton CMA took out permits worth $1 billion in Q2 2016, which is a 48% decrease from the $2 billion permit values seen in Q1.⁵

Year-over-year, the value of building permits was down by 38% in Q2 2016 when compared to Q2 2015.⁶

PROXIMITY TO RESOURCES DRIVES ENTERPRISE

Driving Edmonton’s economic engine is its proximity to and connection with Alberta’s world-class energy and natural resources.

Edmonton is the major urban research centre, manufacturing, supply and service hub for Northern Alberta’s massive oil sands and gas sectors. Alberta’s other two key resource industries include agriculture and forestry.

With 97% of Alberta’s oil found in the Edmonton service area from Red Deer to the Northern Alberta border, Edmonton is the place to be for industrial investors.⁷

¹ Edmonton Census 2014
² Edmonton Census 2014
³ Highlights of the Alberta Economy 2016
⁴ Highlights of the Alberta Economy 2016
⁵ Economic Indicators. City of Edmonton August 2016
⁶ Economic Indicators. City of Edmonton August 2016
⁷ Government of Canada, Invest in Canada, Edmonton
DIVERSIFIED ECONOMY OFFERS RANGE OF OPPORTUNITIES

Edmonton’s powerful resource engine drives a diverse range of economic sectors that supply, service, design, construct and manage many direct and ancillary activities. The Conference Board of Canada’s stated that Edmonton’s economic structure is very diverse scoring an .89 out of rating of 1.0.

Consumer-driven sectors flourish when there is a healthy level of disposable income and population growth. Together, these factors offer a snapshot of Edmonton as a dynamic, growing and sustainable community.

With billions of dollars being invested from the public and private sectors, a thriving regional customer base is created to support local business growth and the ability to attract new, world-class sector leaders in:

- engineering,
- construction,
- industrial manufacturing,
- petrochemical processing,
- environmental technologies,
- transportation and logistics,
- finance, management and information technology, and
- a diversified range of supply and service businesses.

SKILLED, MOTIVATED WORKFORCE A FOUNDATION FOR GROWTH

Access to resources and customers creates business and industrial development opportunities. However, skilled and motivated labour force is also needed to realize this potential. Edmonton benefits from a younger growing population which is actively motivated to work.

- Over the last decade, Edmonton’s population has increased by 165,535 people, to 899,447 in 2016.
- Our economy and strong employment rate has continued to draw people to Edmonton, most of whom are between the ages of 24-30.
- Edmonton has a seasoned and sizable workforce over 45 to mentor younger employees.
- Albertans had the highest productivity rate in Canada in 2013.
- A workforce participation rate of nearly 73% illustrates a population actively engaged in contributing to and benefiting from Edmonton’s economic prosperity.

Edmonton’s successful economic growth is realized by a healthy mix of local workforce growth, a successful track record in inter-provincial migration and a growing trend of attracting skilled workers from around the world.

1 2016 Growth Monitoring Report
2 2016 Growth Monitoring Report
3 Highlights of the Alberta Economy 2013
4 Edmonton Indicators June 2013
A growth in immigration over the past decade has added significantly to the multicultural nature of Edmonton’s workforce and community. These skilled immigrants expand the multi-national capacity of the community and bring a rich network of global connections from Asia, the Middle East, Europe and South America.

The Province of Alberta’s recent inventory highlights over $222 billion of active projects either under construction or proposed to start in 2016 in Alberta.

Edmonton’s diversified labour pool provides needed worker skills to a range of industries. Drawing from the regional population base of over 1.3 million, an estimated 62% of the local labour force has post-secondary education or apprenticeship training and another 23% are high school graduates.¹

The top three fields of study include:

- architecture, engineering and related technologies,
- business, management and public administration, and
- health, parks, recreation and fitness.

The top five occupational fields are:²

- business, finance, administration and management,
- service and service occupations,
- trades, transport, equipment operators, manufacturing, utilities and related occupations,
- education, law, government-related services, and
- natural and applied sciences and related occupations.

These skilled occupations support a diverse range of industries that contribute to Edmonton’s economic success story.

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¹ Statistics Canada 2015
² Statistics Canada 2015
EDMONTON HAS THE MOST COMPETITIVE CORPORATE TAX ENVIRONMENT OF ANY MAJOR CANADIAN CITY”

KPMG’s 2016 Competitive Alternatives Special Report on Taxes

EDMONTON HAS THE MOST COMPETITIVE CORPORATE TAX ENVIRONMENT OF ANY MAJOR CANADIAN CITY”

“EDMONTON HAS THE MOST COMPETITIVE CORPORATE TAX ENVIRONMENT OF ANY MAJOR CANADIAN CITY”

KPMG’s 2016 Competitive Alternatives Special Report on Taxes

GREATER EDMONTON CONSISTENTLY TOPS COMPETITIVE RANKINGS

Edmonton’s economic environment also offers a cost-competitive business environment for most sectors and stacks up well against global competitors. In a regional comparison Edmonton ranked third for having low business costs.

Canada has a great cost advantage on the world stage with total costs 27.7% below the U.S. baseline. KPMG’s 2016 Competitive Alternatives Guide to Business Locations ranked Canada with a cost advantage of 14.6% over the United States.

For sectors where office property is a key cost input, current Class A properties located in downtown Edmonton have gross rental rates in the range of $41 to $47 per square foot. This rate is competitive with other major Western Canadian cities such as Calgary and Vancouver which range from $48 to $54 per square foot respectively.

1. 2016 Competitive Alternatives Report, KPMG

STRAIGHT CUSTOMER BASE

+ COST COMPETITIVE ENVIRONMENT

X STABLE, SECURE FUNDAMENTALS

= LONG-TERM PROSPERITY
Edmonton’s Large Employers by Sector

ENGINEERING & CONSTRUCTION
- Associated Engineering
- Chemco Electrical Contractors Ltd.
- EBA Engineering – a Tetra Tech Company
- Hemisphere Engineering
- PCL Group of Companies
- Stantec
- Williams Engineering
- WorleyParsonsCord Canada Services Ltd.

MANUFACTURING
- All Weather Windows Ltd.
- AltaSteel Ltd.
- CCI Thermal Technologies Inc.
- CESSCO
- Finning Inc.
- Lafarge Canada Inc.
- Logican Technologies Inc.
- McCoy Corporation
- U. S. Steel Canada Inc.
- Waiward Steel Fabricators Ltd.
- ZCL Composites Inc.

RESOURCE RELATED
- Dreco Energy Services Ltd.
- Suncor Energy Inc.
- Tri-City Drilling (1968) Ltd.

UTILITIES AND TRANSPORTATION
- CN Rail
- CP Rail
- Canadian Utilities Limited
- Enbridge Pipelines Inc.
- EPCOR Utilities Inc.
- Mammoet

EXPORT MARKETS
Key advantages to locating in Edmonton include access to a sustained domestic market, excellent transportation infrastructure and established trading relationships with U.S. and Asian markets.

With the Province of Alberta’s GDP of over $326.4 billion,¹ in 2015 a significant amount of our province’s economic activity was generated from a strong domestic customer base principally from Western Canada.

Alberta is a major exporter of energy and agricultural resources and manufactured products. Exports in 2015 totaled approximately $92.3 billion worth of goods to 195 countries, a decrease of 24% from 2014. Alberta’s largest market is the U.S., followed by a rapidly growing and increasingly diverse customer base from Asia.⁴

The Greater Edmonton area is home to Alberta’s largest manufacturing and processing centre. After a decline during the recent recession manufacturing exports increased by 21% between 2010 and 2015 to $23.9 billion. Manufacturing shipments including products from its top sectors – petrochemicals and chemicals, metal fabrication and machinery.⁵

As Edmonton’s professional and technical service sector grows to support the demands of a world-class energy sector, many of these firms are now taking their Alberta know-how to the global marketplace.

¹ Edmonton Economic Development Corporation 2013
² Highlights of the Alberta Economy 2015, Government of Alberta
⁴ Alberta’s International Strategy 2015, Government of Alberta
⁵ Regional Economic Indicators – Capital Region July 2013, Government of Alberta
EDMONTON’S FUTURE IS BRIGHT –

EDMONTON’S ECONOMIC FUTURE will build upon its core fundamentals as Alberta’s major manufacturing centre and the major northern urban supply and service centre. Edmonton is at the crossroads between northern resources and U.S. and Asian customers. The strong economic performance of the past several years sets the stage for sustained future growth.

OIL SANDS HAVE DRIVEN NATIONAL AND PROVINCIAL ECONOMIC GROWTH

A couple of significant developments at the end of November 2016 set the stage for a return to positive growth in Alberta. First, the federal government gave its approval to two major pipeline projects, which will improve access to market in the province’s energy sector. Second, OPEC announced a meaningful reduction in crude oil production starting in January 2017 that will chip away at the global supply glut and put oil prices on a higher trajectory. Both changes will boost incomes in Alberta after a two year-long recession.

The signs of economic improvement from the U.S. also bodes well for Alberta, the primary supplier of U.S. energy, as does the growing emphasis that both Canada and Alberta have placed on increasing exports to Asia – particularly China.

ALBERTA’S MAJOR ECONOMIC DRIVERS ensure that business decisions made today will deliver business results for years to come.

With energy investment declining, trade has driven Alberta’s economy in 2016. Exports will increase, lifted by rising oil sands production and a weaker dollar, while imports will decline due to the pullback in investment.

In addition to primary energy exports, much of this growth will come from manufacturing, petrochemical production, engineering technology and the supply and service sectors that are intrinsically linked to Alberta’s energy sector.

Petroleum manufacturing will expand in 2017 with the completion of the $8.5 billion North West Upgrader, which will add 50,000 barrels per day in refining capacity.

Other value-added processing of hydrocarbon resources offers strong business opportunities in the processing of petroleum off gases, particularly ethane, ethylene and propylene derivatives.

Alberta’s plentiful supply of natural gas, rich in gas liquids, offers an important feedstock for the petrochemical industry, a key strength in Edmonton’s economy. It also offers a low-cost fuel alternative.

Low natural gas prices are expected to persist, with the Alberta Reference Price averaging $2.94/GJ in 2015-16 and staying below $4.00/GJ over the forecast period due to plentiful North American supplies.

Alberta’s secure gas feedstock supply and domestic demand contribute to a strong business case for more value-added processing of key derivatives such as methanol, ammonia and urea.

This, coupled with the potential to produce other derivative products such as ethane/propane and ethylene and propylene, highlights the range of industrial processing opportunities available in the Edmonton area for the near future.

PROXIMITY of conventional and unconventional low-cost natural gas and access to Edmonton’s pool of talent provide outstanding new petrochemical and off-gas processing opportunities.

CONTINUED GROWTH PROJECTED FOR AGRICULTURE

According to a BMO Economics Agriculture Report, February 2014, the Canadian livestock industry is set to benefit from a variety of factors, including lower feed costs, the weaker Canadian dollar and expected stronger economic growth on both sides of the border.

1. RBC Alberta Provincial Outlook. December 2016
2. Albert Economic Outlook 2015
3. Conference Board of Canada, Metropolitan Outlook, Spring 2014
5. Economic Outlook, Budget 2013, Government of Alberta
6. BMO Economics, Livestock Report April 2014
World prices are expected to be pressured by abundant world supplies, however, prices in Canada are expected to receive some support from the weak Canadian dollar.

In 2015-16, government continued to build Alberta’s profile as a partner and reliable supplier of premium agriculture, food and forestry products to increase trade and exports. In 2015-16, 26 Alberta exporters were introduced to new markets. Alberta’s agri-food exports by market and by sector continue to grow.

Alberta’s agricultural industry continues to be competitive with farm cash receipts for 2012 gaining approximately 14% led by gains in crop receipts. This growth trend is continuing in 2013 with 9.8% growth in the first quarter resulting in a record $3.8 billion in receipts.

There are emerging enterprises that are looking at processing either by-products or agricultural waste into fuel or ‘green’ building products.

Creating an expanded product base through innovation and technology is another way Alberta is supporting value-added processing of its resources.

Supporting this innovation are facilities such as Alberta Agriculture’s Food Processing Development Centre located in the Greater Edmonton area.

This facility is staffed with food scientists, engineers and technologists who work with industry to strengthen and expand their capacity to bring new products to market.

Edmonton continues to service the domestic and export agricultural market through:

- its strength as the centre for research and development,
- its machinery and equipment manufacturing, supply and service sectors, and
- targeted agri-food and fertilizer production.

MANUFACTURING, CONSTRUCTION AND SUPPLY AND SERVICING KEY TO LOCAL GROWTH AREAS

The strength of Edmonton’s manufacturing, construction and supply and servicing sectors offers the best locational opportunity to capitalize on future growth.

Sustained energy sector activity and population growth will support the following annual compound growth rates over the 2016 – 2019 forecast period:

- wholesale and retail trade sector by 2.2%,
- industrial sector by 1.4%,
- office and personal services sector by 2.4% and 3.1% respectively, and
- transportation and warehousing sector by 2.3%.

1 Canada: Outlook for Principal Field Crops January 2015
5 Conference Board of Canada, Metropolitan Outlook, Spring 2015
INFRASTRUCTURE INVESTMENT CONTINUES

To support a growing economy, major new transportation infrastructure will soon be completed. In 2012 the Edmonton International Airport opened a major expansion to support significant growth and improve efficiency in trans-border passenger service.

Edmonton’s major ring road, Anthony Henday Drive, is complete with the opening of the northwest leg. With the ring road complete, there will be an improved connectivity between Edmonton’s northern rail yards and Highway 2 south to the U.S. border. This improves access between Alberta’s northern resource markets and Edmonton’s industrial areas.1

Major upgrades are underway to the CN lines in Alberta. Canadian Pacific is currently planning a new south side intermodal yard. Kinder Morgan has recently completed 4 major projects expanding the ability to transport petroleum products and crude oil in North America. There are two more projects underway (Base Line and Edmonton South Rail Terminals).2

Two major pipelines, the Trans Mountain and Line 3 will pump nearly a million more barrels of oil a day from Alberta’s oilsands to global markets, as they have recently been approved. The Trans Mountain will move a mix of oil products from Edmonton to a terminnal in Burnaby B.C., near Vancouver where it will be exported to markets in Asia.3

The proposed Keystone pipeline will increase capacity to the U.S. market.4

Additional power transmission infrastructure development of two new north-south power lines provide additional transmission capacity for Edmonton’s major industrial areas located in or near Alberta’s Industrial Heartland.

Infrastructure investment in expansion of the light rail transit system, major new downtown projects such as Roger’s Place Arena and The Alberta Museum and arts education complex demonstrates business confidence in Edmonton’s future.

EDMONTON REMAINS COST COMPETITIVE

Edmonton offers competitive rental and land purchase prices compared to other major Western Canadian cities such as Calgary and Vancouver.

Edmonton’s workforce is projected to grow by approximately 1.2% per year until 2018 with unemployment forecast in the 5.2% range.5

Affordable and diverse styles of housing are an important ingredient in attracting a talented workforce, and Edmonton continues to offer one of the more affordable places to buy or rent housing. Multi-unit housing starts will move lower in 2016 and 2017, while single-detached housing starts are projected to increase modestly in 2017.6

The tightened rental vacancy rate is projected to which has tightened dramatically since 2010.RBC ranks Edmonton’s housing market as the most affordable among Canada’s top municipalities.7

In October, 2016 the Government of Canada announced measures designed to support the health and stability of Canadian housing markets and housing finance system. The measures include new eligibility rules for high ratio insured mortgages and new eligibility criteria for low ratio insured loans (loan-to-value less than 80%) that previously only applied to high ratio mortgages. Under the new measures, all high ratio mortgages will now be “stress tested” to ensure borrowers can afford their loan if interest rates rise.8

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3. Trudeau cabinet approves Trans Mountain, Line 3 pipelines www.cbc.ca/news
4. Conference Board of Canada Metropolitan Outlook, Spring 2016
5. Canada Mortgage Housing Corporation, Housing Starts Fall 2016
6. Canada Mortgage Housing Corporation, Housing Starts Fall 2016
7. Canada Mortgage Housing Corporation, Housing Starts Fall 2016
8. CMHC Housing Market Outlook,
Edmonton offers industry all the fundamental building blocks needed for industrial success – industrial land of all sizes serviced by quality transportation and utility infrastructure, urban-standard transit, protective services, and ready access to critical feedstock, labour, training, research and business support services.
OUTSTANDING CONNECTION TO MARKETS – MOVING GOODS AND SERVICES

Whether markets lie offshore, in the U.S. or closer, Edmonton’s transportation infrastructure offers outstanding access to customers. Edmonton can deliver the freight or cargo services needed for shipping products from mining equipment to fresh produce.

AIR SERVICE

Edmonton’s International Airport served 8.2 million passengers in 2014, and by 2020 is anticipating serving 9 million passengers. Service highlights include:

- regularly scheduled flights to all major Canadian cities,
- non-stop flights to more than 50 destinations,
- non-stop flights to 12 key U.S. hub cities,
- non-stop flights to 15 international destinations, and
- has a total catchment area of 1.8 million residents

The airport’s cargo capabilities are designed to expedite shipments to all parts of the globe quickly and cost effectively. Highlights include:

- Fifth busiest airport by passenger traffic in Canada
- 24-hour access year-round with no operational or noise restrictions
- 24-hour customs service
- a full range of air cargo services and facilities for all types of aircraft
- among the lowest aviation fees, warehousing and real estate rates, handling charges, fuel costs and trucking rates in Canada

expertise in moving heavy and oversized loads for the oil, gas and oil sands industries
- can accommodate the world’s largest cargo aircraft such as the AN 124
- bonded warehousing for international cargo

Cargo services available:

- 11 airlines
- nine integrated couriers/freighter carriers
- two independent cargo handlers
- more than 25 freight forwarders and customs brokers
- five cargo-handling terminals (including three with coolers/freezers)

1 Edmonton International Airport Authority, Fact Sheets 2015
2 Shanghai Daily News July 2015
RAIL AND INTERMODAL SERVICE

Edmonton is linked to continental and Asian export markets by two Class-1 rail services provided by Canadian National (CN) and Canadian Pacific (CP) railways. Highlights include:

- CN and CP operate approximately 7,000 route miles in Alberta and transport about 66 million tonnes into and out of the province.

- Major commodities moved by rail include agricultural products, petrochemicals and forest products as well as a wide range of consumer products shipped in containers.

- CN’s network of 20,600 route-miles of tracks is North America’s only transcontinental network linking eight Canadian provinces, 16 American states, Mexico and all three coasts.¹

- CN’s Western Canadian network operations centre is located in Edmonton and provides direct service to both Prince Rupert and Vancouver.

- CN’s Northern Line runs from the deep water port of Prince Rupert through the lowest-grade mountain passes in the Rocky Mountains to Edmonton and beyond.²

- Edmonton’s CN yards offer intermodal services from its northwest Edmonton site.

- CP connects Edmonton to Canada’s southern trans-Canada route from Vancouver to Montreal and south to key eastern U.S. markets.

- CP Rail has approximately 14,000 miles of rail track across Canada and the United States.³

- CP services the intermodal needs of its customers from its south Edmonton site.

¹ CN Fact Sheets /www.cn.ca/ 2015
² Prince Rupert Port Authority Advantages website
³ CP Fact Sheets http://www.cpr.ca/ 2015
Edmonton is linked by road, rail and pipeline to Canada’s largest west coast port in Vancouver, B.C. The Port of Prince Rupert Container Terminal is an ultra-modern, high-capacity North American container facility connected to the North American continent by CN’s network. It is the closest port to Asia by up to 58 hours of sailing time compared to any other North American west coast port.

Edmonton is also connected by road and rail to the Port of Kitimat, the third largest deep water port on the west coast and the proposed location for a major LNG marine terminal re-gasification facility and tank farm with a projected 12.5 LNG shipments per month. This translates into the export of 10 million tonnes per year.

Industrial and commercial shippers need direct access to intermodal container and cargo services. Both CN and CP railways operate intermodal container yards in Edmonton and both services are currently planning expansion. The Edmonton International Airport’s AirLINKS cargo park offers convenient access to two intermodal rail yards that provide inland and marine container service. Combined with an extensive network of highways, Edmonton keeps industry in touch with raw materials – and customers.

1 www.cn.ca/en/shipping-ports-prince-rupert.htm
2 Chevron Canada http://www.chevron.ca/2015
ROAD TRANSPORTATION - SUPERB CONNECTIONS

Edmonton has a highly developed roadway network connecting the region, the country and south all the way to Mexico.

MAJOR HIGHWAYS

The Yellowhead Highway and Trans-Canada Highway are the major Canadian east-west connectors. Alberta is also connected to key U.S. and Mexican markets through the Canamex Highway.

Edmonton is connected to continental markets and key ports. It is situated on the Yellowhead Highway, connected through Highway 2 to Canada’s southern Trans-Canada route and is the northern-most point of the Canamex Highway offering connections to the U.S. and Mexico.

Edmonton is an important transportation centre on the Ports to Plains Corridor route. This route links the Port of Prince Rupert through the prairies and major Midwest U.S. cities to the Texas gulf coast, which links to the North American Super Corridor (NASCO corridor) that has highway connections to Midwest and southern U.S. markets and ports.
EDMONTON AREA RING ROADS

The Anthony Henday Drive ring road has improved travel around the city. It has facilitated efficient travel around the Capital Region, especially northern and western transportation logistics sites to the international airport and Highway 2 south. All of Edmonton’s four major industrial districts are adjacent to major highways. There are designated routes to move high, heavy loads from the Edmonton region to oil sands projects in Northern Alberta.

PIPERLINES – SERVE NORTH AMERICA AND ASIA

The Edmonton area is a major centre for pipeline connections. Lowcost, long distance transport is vital to the economic success of plant sites in the Edmonton Region.

The province has an extensive system of more than 373,000 kilometers of crude oil, natural gas, sour gas, and other pipelines. They are used to distribute most feedstock and natural gas, as well as distribute hydrocarbon products such as ethane and hydrogen.

Called the Alberta Hub, this infrastructure delivers up to 17 billion cubic feet per day (Bcf/d) of natural gas from the Alberta and Western Canada Sedimentary Basin to domestic and U.S. markets.\(^1\)

The Edmonton region includes the Enbridge pipeline system—Canada’s largest and the world’s longest crude oil and liquids pipeline system.

The system consists of approximately 9,000 kilometers of mainline pipe in Canada and over 6,000 kilometers of mainline pipe in the United States extending to the US Gulf Coast\(^2\). Over 3 million barrels of crude oil travel through Canadian pipelines every day at a speed of 5 kilometers per hour.\(^3\)

Energy exports account for the largest share of Alberta’s export market and totaled approximately $75.2 billion in 2013.\(^4\)

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\(^1\) Alberta’s Industrial Heartland website, Transportation page
\(^2\) http://albertacanada.com/about-alberta/ti-about-the-industry
\(^3\) CEPA Website http://www.cepa.com/ 2015
\(^4\) Highlights of the Alberta Economy 2014, Government of Alberta
ACCESS TO NATURAL RESOURCES AND FEEDSTOCKS

Alberta is located within the Western Canadian sedimentary basin, home to the Northern Alberta Athabasca oil sands area and the new shale oil and gas plays of Duvernay, Muskwa and Montney that offer natural gas rich in methane, ethane and other gas liquids. These are the foundations of Alberta’s energy sector. Couple this with huge tracks of northern boreal forest and prime agricultural land and it is clear that Alberta’s resources will support various enterprises for years to come. Edmonton is centrally located for industrial producers to access the following natural resources:

- Coal
- Oil
- Bitumen (oil sands)
- Natural gas
- Forestry products
- Grains, seed oils and livestock (cattle, hogs and poultry)

Fossil fuel reserves indicate secure supplies for current and future petrochemical production.

HYDROCARBON RESERVES AND PRODUCTION LEVELS

<table>
<thead>
<tr>
<th>PRODUCT</th>
<th>REMAINING ESTABLISHED RESERVES</th>
<th>2013 PRODUCTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Natural gas</td>
<td>33.7 trillion cubic feet</td>
<td>3.6 trillion cubic feet</td>
</tr>
<tr>
<td>Shale gas</td>
<td>3,406 trillion cubic feet</td>
<td>600,000 metres²/day</td>
</tr>
<tr>
<td>Conventional oil</td>
<td>1.8 billion barrels</td>
<td>213 million barrels</td>
</tr>
<tr>
<td>Bitumen (excluding SCO)</td>
<td>167 billion barrels</td>
<td>761 million barrels</td>
</tr>
<tr>
<td>Raw coal</td>
<td>37 billion tons</td>
<td>32 million tons</td>
</tr>
</tbody>
</table>

In 2015, Alberta produced 68% of Canada’s natural gas and 80% of Canada’s oil and equivalent. More than 60% of Canada’s total oil and equivalent production was marketable bitumen.

Edmonton is part of Alberta’s Industrial Heartland (AIH) region - Canada’s largest chemical and hydrocarbon processing area. The AIH region encompasses 582 square kilometers (225 square miles) of industrial land. The AIH partner municipalities that have complementary land use plans and work together to promote heavy and medium industrial development.

AIH is home to 15 world-scale hydrocarbon processing facilities which contribute to 43% of the nation’s basic chemical manufacturing. This important cluster of global chemical processors produces a wide range of value-added petrochemical products. Current reserves and production levels for hydrocarbon feedstock are as noted.

CONVENTIONAL NGLS (10⁶m³ liquid) raw reserves as of December 31, 2014

<table>
<thead>
<tr>
<th>PRODUCT</th>
<th>TOTAL RESERVES</th>
<th>2014 PRODUCTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ethane</td>
<td>162.5</td>
<td>12.7</td>
</tr>
<tr>
<td>Propane</td>
<td>75.3</td>
<td>8.7</td>
</tr>
<tr>
<td>Butane</td>
<td>38.6</td>
<td>4.7</td>
</tr>
<tr>
<td>Pentanes plus</td>
<td>42.7</td>
<td>9.1</td>
</tr>
<tr>
<td>Total</td>
<td>319.1</td>
<td>35.2</td>
</tr>
</tbody>
</table>

Note: Ethane gas reserves = 106.5 million cubic meters (10⁶m³ liquid)

UTILITY, TRANSIT AND PROTECTIVE SERVICES

High quality, accessible utility and protective services are fundamental for successful industry. Edmonton’s industry is provided with a range of quality services from reliable power, water and waste management to public transit accessing a city-wide labour pool.

WATER AND POWER UTILITIES IN EDMONTON

EPCOR, a municipally owned corporation, and its wholly owned subsidiaries build, own and operate electrical transmission and distribution networks, water and wastewater treatment facilities and infrastructure in Canada and the United States. The City of Edmonton is EPCOR’s sole shareholder. EPCOR, headquartered in Edmonton, is an Alberta Top 55 employer.

EPCOR’s water and wastewater experts focus on analyzing total water management processes and consider ways to mitigate risks and maximize ongoing operational efficiency, including water reuse opportunities.

EPCOR’s Quality Assurance Laboratory is one of only a few Canadian water testing facilities to be accredited by the U.S. Environmental Protection Agency.

WATER ACCESS FOR INDUSTRY

Alberta’s supply of water is a precious resource for all us. The Government of Alberta’s approach to sound water management is guided by the renewed “Water for Life” strategy.¹

Alberta Environment and Sustainable Resource Development also facilitates a Water Management Framework for the Industrial Heartland and Capital Region, recognizing that a thriving industrial sector forms the backbone of Alberta’s economy.² The Capital region and Industrial Heartland is home to world-scale refining of oil and gas, chemical and petrochemical facilities and is a region of significant potential for new investment opportunities in the energy and manufacturing sectors. Over $25 billion has been invested in new and expanding facilities within the Heartland region and another $18 to $24 billion is expected in the next 15 years.³

WATER TREATMENT

EPCOR owns and operates two water treatment plants in Edmonton. The Rossdale plant is located downtown and the E.L. Smith plant is located 18 kilometers further upstream. These facilities provide safe, reliable drinking water to more than a million people in Edmonton and 65 communities in the Alberta Capital Region. The water treatment process uses free chlorine, chloramines and UV light for disinfection. The two plants have a total capacity of 680 million liters per day.

WASTEWATER TREATMENT

EPCOR’s Gold Bar wastewater treatment plant, one of the largest of its kind in Canada, is at the forefront of wastewater treatment technology through continual upgrades and reliable compliance to regulatory standards.

Current treatment capacity is 310 million liters per day which equates into a volume of approximately 100,000 million liters annually.

Consistent with the City’s eco-industrial priorities, Gold Bar also supplies up to 15 million liters per day of high quality process water to Suncor Energy’s Edmonton refinery. Process water from EPCOR may also be an option for other industrial clients.

In addition, EPCOR’s expertise supports industrial development outside the Edmonton region. It supplies water and wastewater services to more than 6,000 workers at Northern Alberta oil sands camps and mining sites.

The Alberta Capital Region Wastewater Commission (ACRWC) is a model of regional cooperation providing wastewater transmission and treatment services to 13 municipalities in the Alberta Capital Region.

The Commission provides safe, reliable, cost-efficient and environmentally responsible wastewater transmission and treatment. The ACRWC contributes to the health and safety of Albertans and their ecosystem while enabling the growth and development of our member communities.

¹ http://www.waterforlife.alberta.ca/
WASTE MANAGEMENT –
EDMONTON WASTE MANAGEMENT CENTRE (EWMC)

Edmonton’s award-winning waste management system balances economic, environmental and social considerations. Through its direct connection to the community, the utility has achieved some of North America’s highest participation rates in waste reduction, reuse and recycling. Efficient collection services include waste and recycling collection for all households and more than 1,200 businesses.

The EWMC is North America’s largest collection of modern, sustainable waste processing and research facilities. The 233-hectare site includes a variety of facilities for processing both residential and commercial/industrial waste. These include:

- an Integrated Processing and Transfer Facility,
- a Materials Recovery Facility (MRF),
- a combine area of 80,000 square metres of buildings
- a composting facility (the largest of its type in North America),
- an electronic waste recycling facility,
- a construction and demolition waste recycling facility,
- a paper recycling facility, and
- a research and training centre.

World’s first-of-its-kind waste-to-biofuels facility opened in 2014 and will convert 10,000 tonnes of municipal waste into biofuels and chemicals which would otherwise have been sent to landfills.

The EWMC is home to two research centres, the Edmonton Waste Management Centre of Excellence and the Advanced Energy Research Facility (AERF). The AERF is used to test diverse feedstock for gasification into syngas and for production of higher-value liquid products from syngas.
The municipal waste-to biofuels facility will reduce Alberta’s CO₂ footprint by six million tonnes over the next 25 years – the equivalent of removing 42,000 cars from the road every year.

EDMONTON WASTE MANAGEMENT UTILITY QUICK FACTS:

- The Edmonton Waste Management Centre is home to more than 16 processing facilities, both City-owned and privately owned, representing a capital investment of more than $500 million.
- The Edmonton Composting Facility can process 200,000 tonnes of waste and 25,000 dry tonnes of sewage bio-solids annually.
- The Waste-to-Biofuels facility will help the city divert 90% of its residential waste from landfills.
- The Construction & Demolition Waste Recycling Facility is the only facility in the Edmonton area that processes mixed construction and demolition waste.
- Edmonton has one of North America’s highest participation rates in voluntary curbside recycling (93%).

» EDMONTON’S GOAL to divert close to 90% of residential waste from landfill is expected to be achieved in 2017.
POWER AND HEAT

Alberta has a competitive electricity market where industrial power consumers are free to choose a retailer for electricity products and services. Regulated distribution and transmission services are not dependent upon the retailer you choose. A list of licensed Alberta retailers can be obtained at www.ucahelps.gov.ab.ca or by calling 310-4UCA.

Power is delivered through Alberta’s interconnected electric system. EPCOR owns and operates high voltage transmission lines and substations that form part of the Alberta system.

These lines are situated primarily in Edmonton. EPCOR distributes approximately 14% of Alberta’s energy consumption to 323,000 residential and 35,000 commercial consumers through eight distribution substations, 287 distribution feeders and approximately 5,000 circuit kilometers of primary distribution lines.

Industry has the option to convert excess heat, steam or waste products such as methane or agricultural waste from their process into electricity. Surplus power can then be sold to the wholesale electricity market.

Access to natural gas as a heating source ensures building owners benefit from a clean, low-cost fuel alternative. Service is provided throughout the city by ATCO Gas.

Co-generation of power is increasingly being considered as a viable option for promoting eco-friendly development. In addition various public and private partners are also pursuing biomass projects in Edmonton and surrounding communities. These are designed to create a fuel or heating source from waste products or agricultural residues.¹

¹ http://biomassmagazine.com/articles/7506/enerkem-announces-additional-project-equity-financing
PUBLIC TRANSIT

The City of Edmonton operates a comprehensive city-wide bus and light rail transit (LRT) service providing cost-effective public transportation to most neighbourhoods and work sites. The City of Edmonton recently completed a major new leg of LRT service to the southwest quadrant.

The northern leg construction of the LRT is complete and links the city centre with the main campus of the Northern Alberta Institute of Alberta (NAIT).

Construction preparation work is underway in anticipation of major construction activities for the new Valley LRT Line (Southeast to West LRT). Council has also approved the Concept Plan for the South LRT Extension. The map below depicts existing LRT routes in light blue, approved LRT routes in dark blue, and corridors identified as possible future LRT routes in grey.

In addition, the City of Edmonton has a direct LRT/bus link to the Edmonton International Airport. This connects passengers from northeast Edmonton to southwest Edmonton through one easy connection.

POLICE

The Edmonton Police Service (EPS) offers a full range of policing services to businesses and commercial operations within the corporate boundaries of the City of Edmonton.

From 24-hour response teams to crime prevention strategies, from detailed crime statistics by city district to workplace safety strategies, EPS safety and response services offer 21st century solutions.

Edmonton’s neighbouring communities are serviced by various RCMP detachments that work with the EPS as needed.

FIRE AND EMERGENCY RESPONSE

Edmonton’s fire and emergency response teams work with key industries to ensure emergency response plans are in place and appropriate for specific industry-related incidents.

The Edmonton Fire Department responds to fires and medical emergencies with trained fire personnel, emergency medical technicians and paramedics, who carry out fire investigations and promote fire prevention.

A hazardous materials team responds to substance release incidents including chemical spills, cargo tank truck rollovers and radiological and explosion events.
COMMITMENT TO HIGHER EDUCATION AND ADVANCED TECHNICAL TRAINING

The Edmonton region has a population of well over one million people with more than 700,000 people active in the workforce. The workforce is younger, highly trained and representative of multicultural diversity of the region.

Edmonton’s basic education needs are served by two publicly funded K-12 school systems and a range of special charter schools. It is also home to six publicly funded post-secondary institutions and a host of private training schools. Together, they offer a full range of training and educational options to over 180,000 full- and part-time students in the area, supporting the crucial needs of the industrial, manufacturing and construction sectors located in Edmonton.

Edmonton’s publicly funded post-secondary institutions are:

- University of Alberta 39,312 students
- Northern Alberta Institute of Technology (NAIT) 52,200 students
- MacEwan University 19,606 students
- NorQuest College 11,500 students
- Concordia University 1,770 students
- King’s University College 2,427 students

UNIVERSITY OF ALBERTA (U OF A)

The U of A has earned an internationally renowned reputation based on the caliber of its courses of study, teaching acumen and research excellence. The University of Alberta has been ranked as one of the world’s top 100 universities, and the university’s Alberta School of Business is ranked in the top 100 business schools globally by the prestigious 2013 Financial Times of London. The University has an enrollment of over 39,312 in 18 faculties.

The engineering faculty ranks in size among the top five per cent of more than 400 engineering schools in North America. The faculty is internationally recognized, with engineering and information technology ranked among the top 100 in the world out of more than 2,000 universities considered.

The U of A also offers transformative research in many science disciplines, directly supporting Edmonton’s economy. The university is home to the Canada Excellence Research Chair in Oil Sands Molecular Engineering.

Research conducted in relation to the engineering faculty attracts more than $65 million annually in external research funding. As well, the U of A maintains links to Canada’s North and the world’s boreal regions, including close association with the Canadian Circumpolar Institute.

NORTHERN ALBERTA INSTITUTE OF TECHNOLOGY (NAIT)

NAIT serves 30,000 students at their 16 learning sites in the Edmonton area. It is the largest apprenticeship trainer in Canada with the capacity to train approximately 15,000 apprentices annually in 33 registered trades. In addition, the institute offers 120 credit programs leading to degrees, applied degrees, diplomas and certificates as well as providing more than 1,400 continuing education courses.

The NAIT Shell Manufacturing Centre (NSMC) helps Alberta’s manufacturing industries, especially small and medium enterprises, become globally competitive. The centre offers part-time certificates and customized training in productivity enhancement and manufacturing solutions. The centre includes nine high-tech laboratories with state-of-the-art equipment and software.

novaNAIT is the home of applied research and enterprise development at NAIT. Although established only a few years ago, novaNAIT has already found considerable success guiding research toward industry-ready products and services through applied research, technology transfer, industry support, and business incubation.

Another essential fundamental for 21st century entrepreneurial success is a community’s ability to support and further innovation across a range of sectors.

Edmonton excels in this endeavour with its extensive research and development (R & D) infrastructure, appetite for excellence and a strong and growing network of partnerships aimed at exploring new approaches and developing new technologies.

Assets within the University of Alberta, NAIT and the Edmonton Research Park along with provincial and federal facilities give the private sector access to leading research and innovation capacity.

1 MacEwan University Annual Report 2014
2 NorQuest Annual Report 2014
The University of Alberta, one of Canada’s top institutions in energy and environmental research, plays a major role both in supporting Canada’s energy sector and sustaining our environment.

The following are some of the U of A’s major R&D initiatives supporting these sectors:

The Imperial Oil-Alberta Ingenuity Centre for Oil Sands Innovation (COSI) partners with industry to develop breakthrough technologies that will allow Alberta to efficiently and sustainably develop Alberta’s oil sands.

The Centre for Earth Observation Sciences (CEOS) has established partnerships with Syncrude and Suncor Energy and focuses on hyperspectral characterization of oil sands.

The Alberta Centre for Surface Engineering and Science (ACSES) investigates surface characterization and modification. This includes reducing waste from oil sands extraction.

The Centre for Intelligent Mining Systems (CIMS) works on exploratory research in intelligent systems for the oil sands mining industry that integrates sensing with automated reasoning and human interaction.

The Oil Sands Tailings Research Facility (OSTRF) investigates ways to handle oil sands tailings. The goal is to be able to return to a stable landscape directly following mining.

The Centre for Applied Business Research in Energy and the Environment (CABREE) provides applied economic analysis to inform public policy debates on issues of vital importance to Alberta and Canada. Research efforts focus on energy markets, electricity restructuring and climate change issues.

The Canadian Centre for Clean Coal/Carbon and Mineral Processing Technologies (C5MPT) is a research and education centre that supports sustainable and responsible energy and mineral development.

The Alberta Biodiversity Monitoring Institute (ABMI) conducts world-class biodiversity monitoring of more than 2,000 species and habitats to support decision-making with scientific knowledge about provincial biodiversity.

The Faculty of Engineering, with 21 engineering programs and more than 200 professors, 4,400 undergraduate and 1,500 graduate students, is a vibrant research community that attracts more than $50 million annually in sponsored research funding from external sources.\(^1\)

The faculty’s areas of specialty are: energy, natural resources and the environment, biomedical engineering and bioengineering, information and communications technologies, and nanotechnology engineering.

The Faculty of Engineering hosts:
- 1 Canada Excellence research chair
- 15 Canada research chairs
- 16 Natural Sciences and Engineering Research Council (NSERC) industrial research chairs
- 5 Foundation-supported chairs

\(^1\) [http://www.engineering.ualberta.ca](http://www.engineering.ualberta.ca) 2014
NORTHERN ALBERTA INSTITUTE OF TECHNOLOGY (NAIT)

NovaNAIT is the applied research arm of NAIT, offering:
- assistance for industry to prepare proposals and source research collaborations,
- technical services in product development, laboratory services and advisory services, and
- a technical prototype development program that supports the development of technologies, entrepreneurs and companies by funding technical consultancy and product development.

The NAIT Shell Manufacturing Centre (NSMC), the first facility of its kind in Canada to link productivity enhancement services with manufacturing solutions. It was created to help Alberta’s manufacturing industries become globally competitive by providing productivity solutions using both time-tested and innovative technology, manufacturing expertise and practical education.

EDMONTON RESEARCH PARK

The Edmonton Research Park (ERP) is designed to accommodate the smallest to the biggest research companies, offering a variety of facilities suitable to various stages of development:
- Advanced Technology Centre, an incubator for start-up companies,
- Research Centre One with flexible lab and production space for second-stage companies, and
- the Biotechnology Business Development Centre providing specialized lab and office space to second-stage biotechnology companies.

More than 1,500 people work for nearly 55 companies at the ERP, engaged in advanced research in medicine, biotechnology, software, petroleum research, cold climate engineering, nanotechnology and clean energy.

Sites are also available for larger companies to build their own research and development facilities.

EDMONTON WASTE MANAGEMENT CENTRE OF EXCELLENCE

The Edmonton Waste Management Centre of Excellence (EWMCE) is a not-for-profit corporation established to meet solid waste and wastewater challenges worldwide. The EWMCE is a collaborative hub for innovative research, technology development and training.

The EWMCE operates at the core of a unique private-public network of environmental leaders. Its members include the City of Edmonton, University of Alberta, Alberta Innovates – Energy and Environment Solutions, AMEC, NAIT and EPCOR.

The EWMCE incorporates the resources and facilities of all its members. This approach provides the facility with access to diverse research and educational sites. The combined centre and member facilities represent almost $1 billion in assets. Collectively, they offer a tremendous framework for advancing waste management practices.

The municipal treatment facilities provide a full-scale living laboratory making the EWMCE an ideal location for applied research and training.

The Wastewater Research & Training Centre, located at Gold Bar Wastewater Treatment Plant, offers research and training opportunities in advanced biological wastewater treatment.
ALBERTA INNOVATES

The Government of Alberta actively and directly supports a full range of research. The initiatives focus on solving key industry issues using innovation to develop practical solutions including new product development and commercialization.

Alberta aligns the province’s research and innovation system through a family of the five following corporations:

- Alberta Innovates - Technology Futures
- Alberta Innovates - Energy and Environment Solutions
- Alberta Innovates - Bio Solutions
- Alberta Innovates - Health Solutions
- Alberta Innovates - Alberta Research and Innovation Authority

Highly client- and industry-focused, Alberta Innovates - Technology Futures, or Tech Futures, advances ideas and innovations through applied research and commercialization supports to solve problems, enhance productivity and move new products and services to market.

Entrepreneurs, businesses, industry associations and researchers have access to a wide range of technical services and funding support including:

- applied research, technical expertise, laboratory facilities and scale-up services on a fee-for-service basis, and
- commercialization supports including intellectual property management, technology deployment, technology transfer, channel development, financing and investment readiness.

Tech Futures’ goal is to diversify and grow Alberta’s economy. It focuses on sectors key to Edmonton’s economic future:

- petroleum: heavy oil, oil sands, fuels and lubricants,
- environment and carbon management: clean energy, environmental analytical services, geo-sciences, CO2 storage, land and water management, wildlife ecology,
- bio and industrial technologies: advanced materials, industrial sensor technologies, bio-resource technologies, and
- health.

Tech Futures manages a number of consortia and collaborations designed to ensure Alberta’s industry remain competitive including:

MARIOS: a consortium of oil sands producers, materials and equipment suppliers, fabricators and technology providers who collaborate to solve industry-wide problems.

AMFI: designed specifically for Alberta’s metal manufacturing sector, participants gain access to both production and business enhancement expertise developed and provided by some of Alberta’s top research, technology development and process improvement institutions.

EDMONTON’S RAPID EXPANSION

of population 15 years and older – which is more than three times the Canadian average – demonstrates that Edmonton has become one of Canada’s most attractive locations for individuals seeking work. 1
PRODUCTIVITY ALBERTA

With the goal of helping Alberta businesses boost their productivity, Productivity Alberta, a not-for-profit corporation, offers a range of services to help businesses compete more effectively within the global marketplace.

Services include:

- productivity assessment for business,
- a productivity inventory of available tools, services and programs to help business,
- productivity improvement specialists and advisors,
- access to leading practices and success strategies,
- sector-specific productivity improvement projects,
- conferences and training opportunities, and
- productivity networks.

Productivity Alberta works in the industrial products and services sectors to improve not only single businesses, but supply chains from top to bottom. Productivity Alberta’s approach has gained international attention for its approach to engaging industry.

NATIONAL INSTITUTE FOR NANOTECHNOLOGY

The National Institute for Nanotechnology (NINT) is an integrated, multi-disciplinary institution involving researchers in physics, chemistry, engineering, biology, informatics, pharmacy and medicine. Located on the University of Alberta campus, it is housed in a 20,000 sq m advanced research facility and is operated as a partnership between the National Research Council, Government of Alberta and the University of Alberta.¹

CANMETENERGY

With over 450 scientists, engineers and technicians, Natural Resources Canada’s CanmetENERGY is the Canadian leader in clean energy research and technology development.

The CanmetENERGY research facility at Devon, near Edmonton, is home to 130 of CanmetENERGY’s team and provides solutions and knowledge for addressing critical oil sands environmental issues while also ensuring it remains a valuable product for Canada.²

CanmetEnergy’s Devon facility conducts research and technology development programs related to:

- extraction and tailings,
- water management,
- multiphase systems,
- upgrading oil sands and heavy oil, and
- future fuels and emissions.

OTHER EDMONTON-BASED RESEARCH AND DEVELOPMENT ORGANIZATIONS

Edmonton is home to many more businesses and facilities offering their own research to the community and the world. These include:

- Alberta Co-operative Conservation Research Institute
- Canadian School for Energy and the Environment
- Canadian Centre for Isotopic Microanalysis
- Climate Change and Emissions Management Corp.
- Nanofab
- Alberta Water Research Institute
- C-FER Technologies
- AGAT Laboratories
- Schlumberger Global Reservoir Fluids Centre
- Syncrude Research
- TRLabs

¹ www.nint.ualberta.ca
² http://canmetenergy.nrcan.gc.ca
PLANNING AND REGULATORY ENVIRONMENT

The City of Edmonton supports the needs of business and industry, and works with entrepreneurs through the site location and planning and development process. The City has a streamlined review and planning processes that facilitate timely industrial development while ensuring appropriate due diligence.

Over the next five years the City of Edmonton will strengthen this approach through the creation of ‘turn-key’ industrial opportunities.

The City’s Economic Investment and Development Team will work closely with individual clients, other civic staff and regulatory organizations to facilitate and coordinate any regulatory reviews and land use planning and zoning requirements on these major industrial initiatives.

Current processes include environmental protection assessments required by the provincial and federal governments. These regulate water use, the disposal and treatment of wastewater, air quality and more, put in place to ensure a strong and sustainable economy while balancing the needs and interests of industry and the broader community.

EDMONTON ENERGY AND TECHNOLOGY PARK AREA STRUCTURE PLAN

The Edmonton Energy and Technology Park Area Structure Plan (ASP) outlines the future development of an industrial business park focusing on petrochemical and manufacturing plants as well as research and development facilities and the transportation and logistics sector.

The ASP outlines an eco-industrial model facilitating companies’ use of shared utilities and cleaner alternative energy sources. It leads to reduced water use, reduced waste, the preservation of natural areas and the implementation of sustainable building practices.

Final rezoning and subdivision steps, including an Eco-Industrial Design Plan and a quantitative risk analysis, are required before development can begin.

EDMONTON’S REGIONAL AIRSHED

To help protect the environment, all industrial facilities in the Capital Region must be designed and operated so the ambient air quality surrounding the site meets or exceeds ambient air quality objectives as established by Alberta Environment.

The Alberta Capital Airshed (ACA) helps design solutions to local air quality issues, initiating several programs to ensure a high quality of air throughout the region. In addition to ACA, the Fort Air Partnership covers Alberta’s Industrial Heartland region.
EDMONTON SUPPORT SERVICES FOR BUSINESS AND ENTREPRENEURS

Edmonton strongly supports the business community with the right mix of entrepreneurial freedom, business incentives and government support.

CITY OF EDMONTON ECONOMIC INVESTMENT AND DEVELOPMENT TEAM

The City of Edmonton's Economic Investment and Development Team works directly with client companies to ensure industrial investors have what they need for a timely and successful development. The team will work closely with clients to:

• assist with site location, servicing and infrastructure identification needs,
• streamline rezoning and development permit approvals, and
• help coordinate municipal reviews with any provincial regulatory review.

In addition to the core Economic Investment and Development Team, an expanded support team from across the City of Edmonton engages in facilitating industrial investment.

For updated public- and private-sector industrial land listings and current economic and demographic data, check out the City’s industrial land sales site at www.edmonton.ca/industrialdevelopment

For more details, contact:

Ken Mamczasz
Acting Director
Economic Investment and Development
Sustainable Development, City of Edmonton
Ph. (780) 496 6036
Email – Ken.Mamczasz@edmonton.ca

9th Floor, Edmonton Tower, 10111 104 Avenue NW
Edmonton, Alberta, Canada

EDMONTON ECONOMIC DEVELOPMENT CORPORATION

Edmonton Economic Development Corporation (EEDC), wholly owned by the City of Edmonton, promotes economic and tourism development, manages the Shaw Conference Centre and the Edmonton Research Park.

With a focus on key sectors including advanced technology, energy and tourism, EEDC helps companies from around the world establish new businesses in Edmonton through:

• business plan assistance, offering regional business data and assisting in its interpretation,
• regional business connections, bringing key players together for discussions regarding the location process, and
• real estate information, connecting business with real estate resources to assist in the development of detailed plans, industrial land information or real estate surveys.

For more details, contact:

Brad Ferguson
President and CEO
Edmonton Economic Development Corporation
Ph. (780) 424-9191
3rd floor, World Trade Centre
9990 Jasper Avenue, Edmonton, Alberta, Canada T5J 1P7
ALBERTA’S INDUSTRIAL HEARTLAND ASSOCIATION

Alberta’s Industrial Heartland, home to a globally recognized oil and petrochemical processing cluster, is guided by a non-profit association of municipalities dedicated toward sustainable eco-industrial development. Alberta’s Industrial Heartland Association (AIHA) represents municipalities that have land within the Alberta’s Industrial Heartland geographic area.

A leading principle of AIHA is promoting responsible industrial development within the region. This includes ensuring the region is ready for development in its infrastructure, services and land use zoning principles.

AIHA recognizes that activities in the area can have a major impact on neighbouring communities and can affect their service delivery as well. Together, the municipalities take a proactive and cooperative approach to planning and industrial development.

Current member municipalities include City of Edmonton, City of Fort Saskatchewan, Lamont County, Strathcona County and Sturgeon County.

For more details, contact:
Gord Harris
Interim Executive Director
Alberta’s Industrial Heartland Association
Ph. (780) 998-7453
Email: gord@industrialheartland.com

EPCOR

EPCOR offers a wide range of water and electricity services for industrial clients, including:
- water and sewer maintenance,
- meter services,
- high-voltage and instrumentation testing, and
- water lab services.

EPCOR’s Quality Assurance Laboratory is one of only a few Canadian water testing facilities to be accredited by the U.S. Environmental Protection Agency.

OTHER BUSINESS DEVELOPMENT SUPPORT ORGANIZATIONS

Adding to the strength of Edmonton’s business and industrial environment are the following organizations:
- Alberta Entrepreneurs Association
- Alberta Business Incubator Northern Alberta

• Agriculture Financial Services Corporation
• Alberta Opportunity Company
• Alberta Chamber of Commerce
• Business Development Bank of Canada (CASE)
• (The) Business Link, Business Service Centre
• Canadian Organization of Small Business
• Canadian Plastics Industry Association - Western Canada
• Edmonton Chamber of Commerce
• Industry Canada Invest in Canada (International Trade Canada)
• La Chambre economique de l’Alberta
• National Research Council - IRAP Northern
• TEC Edmonton
• Western Economic Diversification
• World Trade Centre Edmonton
INDUSTRY ASSOCIATIONS

Industry associations also add to the rich fabric of industry and manufacturing support in Edmonton. Following are selected highlights of available resources.

FORESTRY
- Alberta Forest Products Association
- Resource Industry Supplier Association of Alberta

ENERGY
- Alberta Chamber of Resources
- Alberta Geological Survey
- Association of Professional Engineers and Geoscientists of Alberta (APEGA)
- Canadian Association of Oilwell Drilling Contractors (CAODC)
- Canadian Association of Petroleum Land Administration (CAPLA)
- Canadian Association of Petroleum Landmen (CAPL)
- Canadian Association of Petroleum Producers (CAPP)
- Canadian Centre for Energy Information
- Canadian Plastics Industry Association (CPIA)
- Canadian Energy Pipeline Association (CEPA)
- Canadian Energy Research Institute (CERI)
- Canadian Gas Association (CGA)
- Canadian Heavy Oil Association (CHOA)
- Canadian Institute of Mining, Metallurgy and Petroleum (CIM)
- Canadian Petroleum Products Institute (CPPI / ICPP)
- Canadian Society for Unconventional Resources (CSUR)
- Canadian Society of Petroleum Geologists (CSPG)
- Canadian Wind Energy Association (CanWEA)
- Chemical Institute of Canada (CIC)
- Chemistry Industry Association of Canada (CIAC)
- Coal Association of Canada (CAC)
- Environmental Services Association of Alberta (ESAA)
- Gas Processing Association of Canada (GPAC)
- Oil Sands Developers Group
- Petroleum Communications Foundation
- Northeast Industrial Association
- Petroleum Human Resources Council of Canada
- Petroleum Joint Venture Association (PJVA)
- Petroleum Services Association of Canada (PSAC)
- Petroleum Tank Management Association of Alberta (PTMAA)
- Petroleum Technology Alliance Canada (PTAC)
- Small Explorers and Producers Association of Canada (SEPAC)
- Strathcona Industrial Association
- Society of Petroleum Engineers Canada
- Solar and Sustainable Energy Society of Canada Inc. (SESCI)

MANUFACTURING
- Canadian Manufacturers and Exporters
- Canadian Chemical Producers Association

DEVELOPMENT AND REAL ESTATE
- Building Owners and Managers Association - Edmonton
- Edmonton Homebuilders Association
- Edmonton Real Estate Board
- Urban Development Institute – Edmonton

DESIGN AND CONSTRUCTION
- Alberta Construction Association
- Merit Contractors of Alberta
- Alberta Association of Architects (AAA)
- Association of Professional Engineers and Geoscientists of Alberta (APEGA)
- Association of Consulting Engineers
- Association of Consulting Architects
STRONG, EXPERIENCED CONSTRUCTION INDUSTRY SUPPORTS DEVELOPMENT

Greater Edmonton’s construction industry is world class and highly experienced in residential, commercial, industrial, institutional, civil and roadway construction.

With billions of dollars of construction built in Alberta over the past decade and over $222 billion in major projects under construction or planned in Alberta over the next decade, Edmonton’s construction industry has played an important part in the city’s success story.

The industry has the skilled workforce needed to rise to the challenge of Edmonton’s economy.

In addition, many local firms have forged a unique skill set needed to address industrial or modular construction needs, cold climate considerations and the challenges of building projects in remote sites.

Edmonton is home to construction firms offering a full range of construction services for projects located in Edmonton, throughout the province and in various locations around the world.

Some major general contractors active in the area include:

- Aecon Infrastructure Group
- Bird Construction
- Clark Builders in partnership with Turner Construction
- Ellis Don Construction Services
- Graham
- Ledcor Group of Companies
- PCL Construction
- Stuart Olson Dominion Construction

Greater Edmonton’s construction industry employs over 55,000 people offering both union and non-union environments. Industry associations and public sector educational institutes such as the Northern Alberta Institute of Technology (NAIT) work together to ensure that the workforce grows to meet the industry’s needs from senior management to specific trade apprentices.1

Innovative workforce development initiatives such as ‘Careers – the Next Generation’ actively encourage young people into construction trades, while ‘Women Building Futures’ targets women for training and integration into the construction industry. Both initiatives highlight how industry partnerships are working to ensure a strong, skilled workforce to support the industry today and in the future.

Edmonton’s construction workforce brings the right mix of skills, experience and training to every job here and around the world.

1 Statistics Canada
2 Market Outlook 2015 at a Glance, CBRE
LOCATING, BUILDING AND OPERATING INDUSTRY IN EDMONTON

MAJOR U.S. LOCATION RESEARCH FIRM BOYD COMPANY finds Edmonton offers the lowest operating costs for head offices of any Western Canadian city and as much as 16% lower than Toronto, Vancouver and Montreal.
EDMONTON’S INDUSTRIAL LAND CAPACITY

Edmonton has four designated Industrial Districts. The districts are strategically located along major transportation corridors and spread throughout the city.

Edmonton has a range of serviced industrial land. It has 1,714 gross hectares (ha) of designated vacant industrial land available for development. In addition there is a further 4,860 gross ha available in the Edmonton Energy and Technology Park.¹

There are more than 738 net ha (1.902 net acres) of vacant zoned industrial land ready for immediate development.²

¹ City of Edmonton Vacant Industrial Land Update, July 2015
² City of Edmonton Vacant Industrial Land Update, July 2015
³ Edmonton Journal, Tuesday July 31, 2012

EDMONTON OFFERS industrial developers the most diverse range of industrial land opportunities within the Greater Edmonton region.³
EDMONTON’S INDUSTRIAL LAND ZONING

The City of Edmonton identifies five main land use zoning designations for economic purposes.¹

- **IB** – Industrial Business Zone – intended for businesses that generate no nuisance outside an enclosed building and compatible with adjacent non-industrial use.
- **IL** – Light Industrial Zone – high quality, light industrial developments with limited accessory outdoor activity and no nuisance outside an enclosed building.
- **IM** – Medium Industrial Zone – suited for manufacturing, processing, assembly, distribution, service and repair uses that carry out part of their operations outdoors and require outdoor storage areas with some nuisances associated with the operations.
- **IH** – Heavy Industrial Zone – industrial uses that due to their appearance, noise, odour, risk of toxic emissions or fire and explosion are incompatible with other residential or commercial land uses.
- **AGI** – Agricultural Industrial Reserve – rural land intended for industrial use but not currently zoned.

In addition to these traditional zoning categories the City of Edmonton has developed specialized eco-industrial zoning for the Edmonton Energy and Technology Park (EETP) with the following specific designations:

- **EETB** – Edmonton Energy and Technology Park Business Park Zone
- **EETC** – Edmonton Energy and Technology Park Chemical Cluster Zone
- **EETL** – Edmonton Energy and Technology Park Logistics Zone
- **EETM** – Edmonton Energy and Technology Park Manufacturing Zone

EDMONTON’S INDUSTRIAL NEIGHBOURHOODS

The following selected neighbourhoods offer competitively priced land for new and expanding investment.

**Cloverbar Industrial (Aurum)** ²

**LOCATION:** Northeast Edmonton – situated south of the North Saskatchewan River and west of the City of Edmonton - Strathcona County boundary

**ACCESS:** Roadways link to Anthony Henday Drive and Yellowhead Trail. A number of major pipeline corridors are situated in the area and has access to both CN and CP rail lines

**OVERALL SIZE:** Vacant zoned industrial is 113 ha

**PARCEL SIZE:** Vacant zoned industrial parcels vary in size from 10 ha to 0.2 ha

**ZONED:** Mix of industrial zonings

**OWNERSHIP:** Mix of private owners

**EXISTING USES:** Transportation, logistics and warehousing and manufacturing sectors

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¹ www.edmonton.ca, City of Edmonton, 2013
² City of Edmonton Industrial Land Update, July 2013
Edmonton Energy and Technology Park (EETP)

LOCATION:  Northeast Edmonton – a part of Alberta’s Industrial Heartland (AIH)

ACCESS:  Bounded by Anthony Henday ring road to the south, Manning Drive to the east, Highway 37 to the north and the Canadian Forces Base (CFB) Edmonton on the west

SIZE:  Total area is 12,000 acres (4,857 ha, or 49 square kilometers/20 square miles)

ZONING:  Four special eco-industrial zones (EETB, EETC, EETL, and EETM) have been approved and can be applied for in accordance with the area structure plan.

VISION:  The EETP provides a vision for a future new eco-industrial area for the City of Edmonton. The opportunity for value-added industries and significant economic spin-off activity based on the development of Alberta’s oil sands was the catalyst for the development of this industrial park.

EETP will be of interest to petrochemical and energy value-added processors who want to capitalize on upgrading, processing and refining natural gas, natural gas liquids, oil and bitumen by-products. Large-scale development opportunities offer outstanding development potential for manufacturers and fabricators with excellent road and rail connections that support a strong transportation and logistics base.

Development is envisioned to include:
- business networks that share common services,
- common pipes and use of waste outputs and inputs for downstream processors,
- ecologically friendly infrastructure and naturalized storm-water management, and
- sites that maximize environmental conditions.

The Edmonton Energy and Technology Park area is currently being used largely for agricultural purposes. It offers investors:
- a location for major green-field development,
- proximity to natural gas, oil and ethane feedstock as well as petrochemicals,
- access to the heavy oil and petrochemical industries northeast of Edmonton,
- access to Edmonton’s world-class labour pool,
- process water options via the North Saskatchewan River, or wastewater,
- rail, road and power line access,
- access to the high-load corridor to Fort McMurray, and
- proximity to the critical mass of manufacturing, logistics and construction supply chains.

EDMONTON ENERGY AND TECHNOLOGY PARK

The intended land uses within the EETP include an integrated cluster of industries connected with hydrocarbon processing, manufacturing, logistics and associated research and technology sectors that will incorporate the following eco-industrial principles:
- sustainable development,
- industrial ecology and efficiency,
- effective transportation,
- land use compatibility,
- innovative infrastructure,
- environmental protection, and
- effective implementation.
### Winterburn Industrial

<table>
<thead>
<tr>
<th>LOCATION:</th>
<th>Northwest Edmonton</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACCESS:</td>
<td>Adjacent to two major highways - the Yellowhead Highway and Anthony Henday Drive. It is serviced by a CN rail line</td>
</tr>
<tr>
<td>OVERALL SIZE:</td>
<td>Vacant zoned industrial land is 179.0 ha ¹</td>
</tr>
<tr>
<td>PARCEL SIZE:</td>
<td>Vacant zoned industrial parcels vary in size, from 5.1 ha to 0.1 ha</td>
</tr>
<tr>
<td>ZONED:</td>
<td>Mix of industrial zonings</td>
</tr>
<tr>
<td>OWNERSHIP:</td>
<td>Vacant land is privately owned</td>
</tr>
<tr>
<td>EXISTING USES:</td>
<td>Predominantly warehousing, wood manufacturing products, office buildings, professional and scientific offices</td>
</tr>
</tbody>
</table>

### Rampart Industrial

<table>
<thead>
<tr>
<th>LOCATION:</th>
<th>Northwest Edmonton</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACCESS:</td>
<td>East of St. Albert Trail and south of Anthony Henday Drive and the Transportation Utility Corridor (TUC)</td>
</tr>
<tr>
<td>OVERALL SIZE:</td>
<td>Vacant zoned industrial land is 12 ha ²</td>
</tr>
<tr>
<td>PARCEL SIZE:</td>
<td>Vacant zoned industrial parcels vary in size between 10.1 ha to 0.1 ha</td>
</tr>
<tr>
<td>ZONED:</td>
<td>Mix of industrial zonings</td>
</tr>
<tr>
<td>OWNERSHIP:</td>
<td>Mix of private owners and the City of Edmonton</td>
</tr>
<tr>
<td>EXISTING USES:</td>
<td>Predominantly logistics, transportation, warehousing, plastics, food and beverage are the primary industrial sectors</td>
</tr>
</tbody>
</table>

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¹ City of Edmonton Industrial Land Update, July 2014
² City of Edmonton Industrial Land Update, July 2014
Maple Ridge Industrial

LOCATION: South Edmonton

ACCESS: Ringed by major roadways including the Sherwood Park Freeway, Highway 216 and Whitemud Drive. The Canadian Pacific Railway bisects the area and there is ready access to the Edmonton International Airport. Maple Ridge Industrial has a number of pipeline corridors.

OVERALL SIZE: Vacant zoned industrial land is 15.88 ha

PARCEL SIZE: Vacant zoned industrial parcels are in the 0.1 ha range

ZONED: Mix of industrial zonings

OWNERSHIP: Vacant land is privately owned

EXISTING USES: Transportation, warehousing and storage, repair and maintenance, recycling, metal fabricators, general freight trucking and construction companies

Ellerslie Industrial

LOCATION: South Edmonton

ACCESS: Adjacent to Highway 2 leading to Calgary and the Edmonton International Airport with a Canadian Pacific rail line running north-south along the western boundary of the neighbourhood. A TUC forms the northern boundary.

OVERALL SIZE: Vacant zoned industrial land is 68.03 ha

PARCEL SIZE: Vacant zoned industrial parcels vary in size from 40 ha to 0.1 ha

ZONED: Mix of industrial zonings

OWNERSHIP: Vacant land ownership is primarily private with some City of Edmonton ownership

EXISTING USES: Plastics firms, machinery and equipment, transportation and warehousing

1 City of Edmonton Industrial Land Update, July 2014
2 City of Edmonton Industrial Land Update, July 2014
There is a wide range of land available for development in Edmonton. Land prices vary based on size, zoning and location. Edmonton’s industrial land prices have remained stable for the past several years. With locational factors taken into consideration, current land sales per acre averaged the following:

- NW - $750,000
- S - $800,000
- NE - $600,000

Current average prices for land located within the City of Edmonton with reduced servicing levels (rural or partial services) range from $40,000 and up depending on location and size.

Edmonton’s average industrial sales per square foot as of March 2015 were:
- Warehouse - $178
- Multi-bay - $125
- Single tenant - $88

Edmonton’s average office sales per square foot as of March 2014 were:
- Downtown high-rise - $207
- Suburban - $198

Edmonton’s average Class A gross rent per square foot as of June 2014 were:
- Downtown - $41 – $47
- Suburban - $30 – $34

With the current absorption rate and new product coming on stream there should be enough supply to meet the immediate demands for the next number of years.

**OFFSITE LEVIES**

The offsite fees and levies are calculated against cost of delivery of the services. Developers pay for the cost of municipal improvements, such as roads and utilities, within the lands they develop. Development can trigger demands for municipal improvements that service a larger area such as arterial roads and sewer trunk mains. The costs of these major services are levied against a larger, “benefiting” area and a number of developers pay for them. Off-site levy rates are set by City Council.
INDUSTRIAL OPERATING COSTS – OVERVIEW

UTILITY COSTS

Average utility costs vary significantly according to the nature of the business or industry and are billed based on a combination of consumption and fixed costs. Utility costs are often negotiated on an individual contract basis with the service provider.

Recent studies have illustrated that Edmonton is near the median in relationship to residential utility rates.1 Edmonton is highly competitive compared to other North American urban centres in relation to gas utility costs.2

While electricity costs are higher than some other locations, this is offset by lower property taxes.

WATER RATES

EPCOR’s rates for potable water, are posted on its website,3 are set for five-year periods (the next renewal date is in 2017). As of August 2016, commercial rates range from $.8489/m³ to $1.4449/m³ depending on volume. Rates are set under a Performance-Based Regulation based on EPCOR’s performance and increases are typically limited to less than inflation.

ELECTRICITY RATES

EPCOR offers the Regulated Rate Option (RRO) to residential and small commercial customers who choose not to select a commercial arrangement. The rate is based on market forces such as supply and demand, and differs from month to month. Over the past three years this...
has averaged about eight cents per kilowatt hour.

For larger customers that use more than 250,000 kWh/year, EPCOR provides default supply electricity service. This rate is based primarily on the electricity pool price. The actual market price of electricity varies from hour to hour depending on weather, time of day and demand for electricity.4

NATURAL GAS

Current regulated natural gas rates for commercial customers range from approximately $2.872/GJ to $3,204/GJ depending on volume, supplier and location.5

PROPERTY TAXES

Edmonton’s property tax rates are some of the lowest in the country. Edmonton does not have a business tax except in locally run business revitalization zones nor does Edmonton charge a tax against machinery and equipment.

This provides industrial investors with significant savings compared to other locations in the region, especially on equipment intensive construction. Most businesses, therefore, pay only a non-residential property tax.

KPMG’s Competitive Alternatives 2014 Cost Model Comparison Report of the per-square-foot property-based taxes for an average manufacturing operation illustrates Edmonton’s low taxes:

- Edmonton $1.78
- Vancouver $2.05
- Toronto $2.01
- Houston $4.49

Edmonton’s industrial neighbourhoods benefit from significant investment of property taxes back into infrastructure and services.

A combination of high quality, flexible servicing and exceptional road and rail access coupled with the lowest property taxes of any major Canadian urban metropolitan area make Edmonton a prime location.

Non-residential properties are appraised using a very transparent methodology. One or more of the following may be used in valuing properties:

- comparison with similar properties that have sold,
- analysis of the typical rental property income and expenses, or
- depreciated replacement cost of buildings plus the market value of the land.

LABOUR FORCE DEVELOPMENT

Edmonton is committed to creating a community and business environment that will retain and attract the workforce needed to capitalize on its bright future.

From its world-class education system that trains and educates our home-grown workforce to support organizations that assist new immigrants to fulfill their dreams of a better life in Canada, Edmonton actively opens its doors to many.

The economic opportunities may motivate many to move to Edmonton, but the lifestyle keeps them here.

The Edmonton Census Metropolitan Area (CMA) June 2015 Labour Force Survey Results illustrate a labour force of 800,000 reflecting a 2.5% year-over-year growth rate.6

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1. 2010 Residential Property Taxes & Utility Charges Survey, City of Edmonton
2. 2010 Competitive Alternatives City Profiles, KPMG
LABOUR COSTS

Edmonton continues to enjoy a very competitive position in regards to location-sensitive labour costs for an average industrial operation as illustrated by the Competitive Alternatives 2015 report’s cost modeling results. Consider the Greater Edmonton area’s advantage:

- Vancouver 1.1% more
- Toronto 3.2% more
- Houston 8.9% more

Currently Alberta is seeing average weekly earning up 0.2% y/y to $1,153 in May 2015 and a consumer price index inflation rate in the 1.7% range.  

Edmonton also benefits from more modest labour rates in many categories compared to other major Alberta centres and is even more competitive with other Canadian and U.S. cities.

Cost comparison for key sectors

Overall Edmonton offers various sectors a very cost competitive environment to expand or locate to. The Competitive Alternatives 2014 rating found between 1–15% differential to a U.S. baseline with an average advantage of 6.5%.

Key sectors were as follows:

- Manufacturing average over 12 types of operations 2.7%
- Specialty chemicals 3.4%
- Medical devices 4.6%
- Precision manufacturing 1.8%
- Metal machining 1.4%
- Professional services 17%
- Research and development averaged over 3 types of operations 16.1%

Current average labour costs are summarized below.

<table>
<thead>
<tr>
<th>OCCUPATION</th>
<th>HOURLY WAGE (ALBERTA MARCH 2015)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Management</td>
<td>$45.34</td>
</tr>
<tr>
<td>Business, finance and administrative</td>
<td>$27.22</td>
</tr>
<tr>
<td>Natural and applied sciences and related occupations</td>
<td>$38.59</td>
</tr>
<tr>
<td>Health</td>
<td>$32.37</td>
</tr>
<tr>
<td>Social science, education, government service and religion</td>
<td>$33.21</td>
</tr>
<tr>
<td>Arts, culture, recreation and sport</td>
<td>$26.27</td>
</tr>
<tr>
<td>Sales and service</td>
<td>$18.70</td>
</tr>
<tr>
<td>Trades, transport and equipment operators and related occupations</td>
<td>$30.12</td>
</tr>
<tr>
<td>Occupations unique to primary industry</td>
<td>$27.32</td>
</tr>
<tr>
<td>Occupations unique to processing, manufacturing and utilities</td>
<td>$25.62</td>
</tr>
</tbody>
</table>

Source: EEDC Site Location Profile, Statistics Canada, unadjusted by province (Alberta, March 2015)

3 Edmonton Indicators, June 2014
Edmonton’s diversified economy and strong economic fundamentals contribute to creating business and industrial development opportunities in many sectors.

The following section highlights the attributes and opportunities available for sector-specific expansion and relocation consideration.
Hydrocarbon Processing Sector

Energy drives Alberta’s economy and its feedstocks drive a globally recognized and competitive petrochemical processing sector.

Alberta has massive reserves of conventional and shale oil and bitumen. The Greater Edmonton area is both connected and competitive for petrochemical processing and the supply and servicing of this key sector.

Sector snapshot

Edmonton is a member municipality of Alberta’s Industrial Heartland, home to global leaders in petroleum and petrochemical processing and Alberta’s largest petrochemical processing cluster. Its strategic location between major resource extraction areas, natural storage capacity and ready access to a skilled and educated workforce have contributed to the area’s reputation as the primary petrochemical and hydrocarbon processing centre for Alberta and Canada.

This region is responsible for a significant portion of the $35.6 billion (2014)\(^1\) earned from Alberta’s chemicals and petroleum refining sector. Revenue is earned from the following sub-sectors:\(^2\)

- $22.6 billion refined petroleum products
- $13 billion chemical products including:
  - 45% from synthetic resins
  - 32% from basic chemicals
  - 23% from fertilizers and other chemicals

The sector employs nearly 14,000 people in Alberta.\(^3\)

The following summarizes the petrochemical product slates available and produced within the Greater Edmonton area.

- Agricultural chemicals
- Anhydrous ammonia and aqua ammonia
- Butane
- Carbon dioxide
- Condensates and heavy distillates
- Ethane
- Ethylene
- Granular urea
- Heating fuels
- Hydrogen peroxide
- Industrial gases and steam
- Iso-octane
- Molybdenum and Vanadium
- Monoethylene glycol
- Natural gas liquids
- Oilseed-based products
- Petroleum coke
- Polyethylene
- Propane
- Propylene
- Resins
- Styrene monomer
- Sulphur-related products
- Synthetic crude oil
- Transportation fuels

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\(^1\) Highlights of the Alberta Economy 2014, Government of Alberta


\(^3\) Government of Alberta, Economic Commentary, Manufacturing Sector, Jan. 29, 2013

\(^4\) Heartland Transmission Project, 2014
Oil and bitumen-based processing

Alberta continues to develop its huge reserves of conventional oil and oil sands while capitalizing on processing these products and their by-products. Greater Edmonton’s well-established refinery and upgrader base with industry leaders such as Imperial Oil, Suncor Energy and Shell continue to upgrade, produce and ship a range of petroleum products.

These industries create significant supply and service opportunities from plant maintenance and turnaround to demand for critical ingredients such as the diluent needed to effectively pipe bitumen.

The North West Redwater Partnership’s new refining facility will upgrade bitumen into high-demand products such as low carbon-standard diesel. It will also utilize gasification technology to capture pure CO₂ that will then be sold to enhance oil recovery prior to deep, safe underground storage.²

Improving access to current and new markets for petroleum products is a priority for both the public and private sector and a series of solutions are moving forward that will lead to a strengthened bottom line for years to come.

TransCanada’s proposed gas pipeline conversion, Energy East Pipeline, will expand capacity to ship 1.1 million barrels/day of crude oil into Eastern Canadian and potentially European markets.³ This new service will expand both domestic and export market potential.

Keyera Corporation and Kinder Morgan Energy Partners L.P. was placed in service in 2014. The construction of the Alberta Crude Terminal is designed to ship 40,000 barrels/day by rail to any Canadian or U.S. market.⁴ Diversifying the transportation delivery system and increasing the market diversification contributes to optimizing the price secured for Alberta’s hydrocarbon products and contributes towards a more favourable business environment for future production and processing.

₁ Alberta’s Industrial Heartland
₂ www.northwestupgrading.com
Conventional natural gas and shale gas processing

Alberta’s conventional and shale reserves offer producers both gas sales and value-added processing potential. Alberta’s shale reserves are unique in that they have a higher-than-average percentage of natural gas liquids – key to processing derivatives.

Alberta’s Shale Gas Play

Investment in Alberta’s emerging shale gas play is becoming more attraction because of:

• improved extraction technologies, reducing production challenges,
• access to a strong domestic market with growth potential in targeted products,
• competitive export price potential for the near term,
• ready access to U.S. and Asian markets through current and proposed west coast shipping facilities and a North American-wide rail and pipeline network, and
• a political will encouraging local value-added processing.

This emerging area of development is well suited to build on the strength of the current sector capacities.

Petrochemical processing opportunities

Edmonton’s future in the petrochemical sector and its related supply and service business is still very strong. It builds on its proximity to low-cost energy and feedstock, world-class processing infrastructure, expertise and a competitive business climate. Abundant low-cost natural gas and increased bitumen production from the oil sands provides an extra
### HIGHLIGHTS OF ANALYSIS

<table>
<thead>
<tr>
<th></th>
<th>Propylene/polypropylene*</th>
<th>Methanol*</th>
<th>Ammonia/urea*</th>
<th>Integrated Ethylene, Polyethylene and Monoethylene Glycol*</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Total fixed investment assumptions</strong></td>
<td>$765 million (combined)</td>
<td>$886 million (combined)</td>
<td>$609 million (combined)</td>
<td>$2.5 billion (Integrated Ethylene Complex)</td>
</tr>
<tr>
<td><strong>Annual cash cost/metric ton (MT) of output assumption</strong></td>
<td>$1,035/MT</td>
<td>$182/MT</td>
<td>$185/MT</td>
<td>LDPE - $785/MT, HDPE - $703/MT, MEG - $420/MT</td>
</tr>
<tr>
<td><strong>Annual global demand growth to 2025</strong></td>
<td>5%</td>
<td>8%</td>
<td>2%</td>
<td>LDPE – 2.7%, HDPE – 4 – 4.5%, MEG – 1 – 1.5%</td>
</tr>
<tr>
<td><strong>Primary growth markets for Edmonton-based plants</strong></td>
<td>U.S., Mexico</td>
<td>Canada, U.S.</td>
<td>Canada, U.S.</td>
<td>North America</td>
</tr>
<tr>
<td><strong>Price-competitive markets for Edmonton-based plants</strong></td>
<td>South America</td>
<td>China</td>
<td>South America</td>
<td>South America</td>
</tr>
<tr>
<td></td>
<td>China</td>
<td>Indian Subcontinent</td>
<td>Indian Subcontinent</td>
<td>China</td>
</tr>
</tbody>
</table>

Source: Business Case for Methanol, Propylene/polypropylene, Ammonia/Urea, Polyethylene and Monoethylene Glycol, IHS Global, Inc., Alberta’s Industrial Heartland 2013

*Note: All three project models assumed to start in 2018, with a capital cost of 10%, life span of 30 years, tax rate of 25% and operating costs as noted

An analysis was undertaken for AIHA in 2013 by IHS Global Inc. to assess the competitive opportunities around specific products. The results illustrate business potential in key sectors.

The detailed analysis was based on a generic business case for siting, building and operating petrochemical plants in the Edmonton area that process:

- propylene/polypropylene,
- methanol,
- ammonia/urea, or
- ethylene.

Highlights of the analysis showcase the opportunity. Access to Alberta’s liquid-rich shale gas reserves and the forecasted long-term attractive natural gas price contribute to very cost-competitive export netback pricing and a double digit internal rate of return for new plants processing any of these products.

Comparing Edmonton’s and Alberta’s competitive position with other producing markets, plants located here can effectively compete when shipping any of these product streams to North American markets – especially polypropylene whose delivered cost to the U.S. is nearly $100/MT lower than product shipped from the Middle East.

To support value-added processing within Alberta, Alberta’s Incremental Ethane Extraction Program provides an incentive through royalty credits to encourage greater production of ethane and promote value-added petrochemical production.¹

With easy access to agricultural or forestry-based feedstock, new opportunities relating to bio-diesel, ethanol and plant-based pulp and plastics are emerging.

Alberta’s deregulated energy market offers opportunities for merchant power generation using traditional fuel sources of coal or natural gas or converting excess heat or steam from industrial processes.

Proximity to feedstock and a significant research and development community rounds out the business case for producing these additives or products and positions Edmonton as the key location for processing.

More details are available on the compelling business case for these four streams by contacting Alberta’s Industrial Heartland Association.

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¹ Incremental Ethane Extraction Program Report to the Legislature, Oct. 24, 2011
Petrochemical sector workforce, training and R & D

University of Alberta
- Home to a dozen key centres of research excellence in resource and processing-related fields
- School of Business – Natural Resources and Energy MBA
- Faculty of Engineering – top 5% of North American engineering faculties and top 5% in chemical engineering
  - features over 6,000 students, over 200 professors and 47 research chairs
  - attracts over $60 million annually from external sources for sponsored research funding
- offers specialized degree programs including a Bachelor of Science in Petroleum Engineering

Northern Alberta Institute of Technology (NAIT)
- Largest apprenticeship training program in Canada with capacity to train 15,000 apprentices annually in 35 trades
- Certificate or diploma programs linked to the petrochemical industry include:
  - Chemical Engineering Technology
  - Engineering Design and Drafting Technology
  - Instrument Technician
  - Materials and Instrumentation Engineering Technology
  - Occupational Health and Safety

Local petrochemical support organizations:
- Alberta’s Industrial Heartland Association
- Strathcona Industrial Association
- Northeast Capital Industrial Association

Sample Wage Rates for 2016¹

<table>
<thead>
<tr>
<th></th>
<th>EDMONTON HOURLY</th>
</tr>
</thead>
<tbody>
<tr>
<td>Industrial instrument technician</td>
<td>$40.70</td>
</tr>
<tr>
<td>Industrial engineer</td>
<td>$53.99</td>
</tr>
<tr>
<td>Chemical engineer</td>
<td>$58.32</td>
</tr>
</tbody>
</table>

¹ www.WAGEinfo, 2016 Alberta Wage and Salary Data
Edmonton’s competitive position

According to KPMG’s Competitive Alternatives 2016 report, Canada offers a 14.6% cost advantage over the U.S.

Edmonton mirrors this cost-competitive position with the following specific advantages:

- 2% - 3% cost advantage over key U.S. production hubs,
- lowest property taxes of 9 comparable locations including no machinery and equipment (M & E) taxes and no provincial sales tax,
- over 60 years of experience working with refining and petrochemical industries,
- an established and growing petrochemical production cluster – many major players are here,
- proximity to low-cost natural gas and oil sands-related feedstock,
- skilled, experienced and motivated workforce with very low work stoppage and unionization rates,
- outstanding pipeline and rail connections to multiple markets,
- ability to optimize utility investments through co-generation,
- readily available industrial land either zoned or designated for a range of industrial operations, and
- a municipal and government environment that is supportive of responsible industrial development.

Annual year-to-year property tax savings in Edmonton strengthen your bottom line

Siting industrial processing plants within the City of Edmonton offers equipment-intensive plants a significant annual tax cost advantage compared to neighbouring jurisdictions that levy a mechanical and equipment (M & E) tax.

1 City of Edmonton Sustainable Development, 2013
Metal Manufacturing Sector

Edmonton is ideally situated and exceptionally well prepared to handle the growing demand anticipated for its manufacturing sector – from both the domestic resource sector and international markets.

With a focus on metal fabrication and machinery manufacturing, Edmonton is the centre of nearly 40% of Alberta’s manufacturing, with the sector contributing to one of the most diverse economies in Canada.

Sector snapshot

Manufacturing – particularly metal fabrication and machinery manufacture – is big business in Edmonton. Fueled by the energy sector, markets are demanding a range of machinery and metal fabrication from pipe and drilling tools to taps, and valves.

Domestic markets remain a dominant focus for the sector. This substantial domestic customer base in Northern Alberta and Northern Canada is easily serviced through the outstanding connections by road, rail and air.

While the manufacturing heavyweights are in metal fabrication and machinery, Edmonton is also home to production for industrial, commercial and residential construction materials as well as a small but innovative food manufacturing sector.

Edmonton’s metal and machinery companies offer a wide variety of goods and manufacturing services. Examples include:

- drilling rigs and tools, pipe, valves, pressurized vessels, pumps, boring or sinking machinery, derricks, instrumentation and truck trailers to transport oversized goods,
- custom solutions and repairs,
- coatings and heat treatments to metals and pipes, and
- component manufacturing and module fabrication and assembly for oil sands and related energy projects.

Edmonton’s manufacturing sector in brief:¹

- Manufacturing accounted for 13% of the Edmonton CMA’s GDP and has grown in Alberta between 2005 and 2010 with sales of $68.1 billion in 2015 which was the highest among the provinces².
- Most of the 2,000 manufacturers in the region are small and medium-sized businesses.
- The sector includes 13 sub-sectors with fabricated metal products (23%) and machinery (15%) the dominant two.

Edmonton’s manufacturing sector plays an important role in the overall contributions from manufacturing to Alberta’s economic success.

Investments in productivity and enhanced production techniques ensure local manufacturers remain competitive with traditional exports markets such as the U.S. In addition, global markets from Mexico to Russia are taking notice of Edmonton’s manufacturing prowess and steadily increasing their business with Edmonton.

Alberta’s metal manufacturing sector in brief:³

- 2015 revenues: $11.5 billion
- Exports: $5.3 billion
- Employees: almost 50,400

The majority of Alberta’s metal manufactured goods stay within Alberta to support the province’s energy sector but exports are picking up steam:⁴

- about 55% of output is shipped to customers within Alberta,
- 15% is shipped elsewhere in Canada,
- about 30% is exported internationally,
- the U.S. is the sector’s largest export market with

¹  http://www.edmonton.com/for-business/3386.aspx
⁴  Metal Manufacturing Profile 2014, Government of Alberta
exports of various types of primary metal, machinery and fabricated metals to Australia, China, Russia, the Netherlands and South Korea.

Transportation infrastructure ensures products from Edmonton can easily reach key domestic and international markets. Edmonton’s major connections to customers include:

- Highway 63 north and CN’s northern link to Fort McMurray and the oil sands,
- the Yellowhead Highway, the northern trans-Canada route,
- CN’s northern trans-Canada line connecting the Port of Prince Rupert to North American markets through Edmonton, and
- the Canamex and Ports to Plains routes that connect Edmonton to key Midwest and southern U.S. and Mexican markets and ports.
- Edmonton International Airport’s air cargo services:¹
  - 11 airlines,
  - eight integrated couriers/freight carriers,
  - three independent cargo handlers, and
  - more than 40 freight forwarders and customs brokers, and
  - five cargo-handling terminals including three with coolers/freezers.

Metal manufacturing opportunities

Northern Alberta’s economic activity expects to drive nearly $200 billion of new construction and maintenance spending over the next 25 years, much of it in fabricated metal products:²

- metal fabrication including the fabrication and assembly of modular processing units, architectural and structural metals; boiler, tank and shipping containers; coating, engraving, heat treating and related activities; and precision machining for turned products and screw, nut and bolt manufacturing, and
- machinery manufacturing for sectors including agriculture, construction, mining, power transmission, heating, ventilation and air-conditioning and commercial refrigeration.

Edmonton’s industrial sector represents the largest employment growth sector in Edmonton, comprising approximately 36% of total forecast employment growth.³

Opportunity in fabricating components for new plant construction and to service the processing sector during routine maintenance and plant upgrades is available. The petrochemical and oil sands processing companies currently project expenditures of 1 – 1.5% of the value of their capital assets on routine annual maintenance.

With $30 billion in capital assets in the region, these expenditures create a sizable customer base for firms specializing in or supporting annual plant maintenance or specialized plant turnaround maintenance both locally and Northern Alberta.

Edmonton is ready – with customers, connections and a cost-competitive business environment to build and operate manufacturing facilities.

¹ Edmonton International Airport, 2015
Edmonton manufacturing companies include:¹

- Alfab Metals Ltd.
- (E.S. Fox Ltd. Constructors)
- Cessco Fabrication & Engineering
- Collins Industries
- Dacro Industries
- CWS Industries
- Edmonton Exchanger & Manufacturing Ltd.
- Flexxaire Manufacturing
- Great Western Containers
- IPEX
- Ledcor Group of Companies (Ledcor Industrial)
- Lenmak Exterior Innovation
- Metal fabricators and welding
- AltaSteel (OneSteel)
- Oxford Machine & Welding
- PCL Group of Companies (PCL Industrial)
- Precision Steel and Manufacturing
- Ramparts Steel
- Shaw Pipe Protection Ltd.
- Spartan Steel Ltd.
- Streamflow Group of Companies
- Supreme Steel Group
- Thermal Design Engineering
- Top-Co Group Inc.
- Truck Master Manufacturing and Equipment Ltd.
- Universal Machine Corporation
- Waiward Steel Fabricators
- Welco Beales Industries
- WorleyParsonsCord Canada

In addition to industrial sites, Edmonton boasts a supply of highly cost-competitive AA office space both in the city core and in business parks located near the industrial districts.

**Metal manufacturing - sector workforce, training and R & D**

Labour productivity in industrial manufacturing exceeds the average for all Alberta sectors.³

Examples of 2016 labour rates in this sector are:⁴

<table>
<thead>
<tr>
<th>EDMONTON HOURLY</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Mechanical assemblers and inspectors</td>
<td>$21.37</td>
</tr>
<tr>
<td>Machining tool operators</td>
<td>$29.06</td>
</tr>
<tr>
<td>Machine operators, mineral and metal processing</td>
<td>$32.54</td>
</tr>
<tr>
<td>Welders and related machine operators</td>
<td>$37.04</td>
</tr>
</tbody>
</table>

A relatively small percentage of manufacturing operations are unionized, labour rates are competitive and work stoppages extremely low.

¹ Hoovers Database January 2012 and Alberta Finance and Enterprise and Edmonton Economic Development Corporation
² City of Edmonton Vacant Industrial Land Update, July 2014
³ Alberta Finance and Enterprise - Alberta Industry Sector Performance and Prospects
⁴ www.WAGEinfo.ca, 2016 Alberta Wage and Salary Data
University of Alberta

- Canadian Centre for Welding and Joining, within the Faculty of Engineering
- Welding and metallurgy a featured area of research within the Department of Chemical and Materials Engineering
- Research focuses on productivity, weldability, automation and performance
- Works with Alberta Innovates and the Government of Alberta to support the Alberta Metal Fabrication Innovation Program (AMFI) offering private sector opportunities to enhance efficiency, productivity and competitiveness
- Faculty of Engineering - top 5% of North American engineering faculties
- Features over 6,000 students, over 200 professors and 50 research chairs
- Attracts over $65 million annually from external sources for sponsored research funding

Northern Alberta Institute of Technology (NAIT)

- Largest apprenticeship training program in Canada with capacity to train 13,500 apprentices in 33 trades annually
- Certificate or diploma programs linked to the manufacturing sector include courses in:
  - airbrake certification
  - autobody
  - automotive
  - blacksmithing
  - fluid power
  - heavy equipment
  - HVAC
  - hydronic design and installation
  - industrial heavy equipment
  - instrumentation
  - machine shop
  - Mastercam
  - mechanical engineering technology
  - millwrighting
  - oil field thread inspection
  - power engineering
  - steamfitter/pipfitter
  - welding

The NAIT Shell Manufacturing gives the sector exposure to leading-edge manufacturing processes and ideas, enabling industry to apply the innovations to their own operations. Specialty areas include lean manufacturing, prototyping, fabrication, control systems, and robotics and automation.

Local metal manufacturing support organizations:

- Alberta Metals Portal
- Alberta Pressure Vessels Manufacturers’ Association
- Canadian Manufacturers and Exports Association - Edmonton
- Canadian Welding Association - Edmonton
- Society for Manufacturing Engineers - Edmonton
- Productivity Alberta
- AVAC Ltd.
- Alberta Innovates – Alberta Research and Innovation Authority
- Alberta Energy Research Institute
- Alberta Metal Fab Innovation (AMFI)

1 http://www.cme.engineering.ualberta.ca/Research/ResearchCentres/CCWJ.aspx
2 http://www.nait.ca/50198.htm
Metal manufacturing sector competitive position

Edmonton is the centre for manufacturing operations within the region which translates into a competitive advantage for future development of this sector and the City.

Edmonton offers metal manufacturers:

- a large and diverse range of industrial land from shovel-ready property for greenfield development to leasing opportunities within existing developed industrial properties,
- a range of service levels, from full urban servicing to partial or rural level services, to meet industry’s needs,
- lowest property taxes of 9 comparable locations including no machinery and equipment (M & E) taxes and no provincial sales tax,
- outstanding road, rail and air connections to bring raw materials into the market and ship final products north to the resource locations and south and west to export markets,
- modern, state-of-the-art utility infrastructure ensuring stable and cost-effective supplies of water, power and natural gas, and
- access to a full range of skilled and semi-skilled labour,
- diverse affordable housing options,
- city-wide public transit service, and
- world-class technical trade training support.
Transportation & Warehousing Sector

Edmonton is the major supply and service centre for northern communities and resource industries as well as the gateway to the thriving Western Canadian market of over 10 million people.

Edmonton is positioned as the transportation hub for moving goods into Western Canada and moving products out to North American and Asian markets. Edmonton is well connected – by road, rail and air service and well serviced by professionals in the logistics sector.

Sector snapshot

Alberta offers an integrated approach to transporting goods and services. Alberta’s transportation and warehousing sector contributes over $11.2 billion annually to the Alberta economy and employs 139,300 people.1

Trucking benefits from Alberta’s modern network of more than 31,000 kilometres of highways that reach north to key resource locations, south to major export markets and west to coastal ports.2 Alberta is served by over 20,000 trucking firms that move 60% of all non-pipeline freight, valued at approximately $7 billion.3

Edmonton is centrally connected at a hub of highways. Highlights include:

- connecting major east/west routes through the Yellowhead Highway, with gentle grades through the Rocky Mountains to the coast,
- northern most connection for the Canamex Highway linking Alberta through the U.S. to Mexico,
- major supply centre on the trucking Ports to Plains Corridor from the northern west coast ports through major Midwest U.S. markets to the Texas coast ports and via the NASCO corridor to additional Midwest U.S. locations and the U.S. gulf coast ports,
- northwest via Highway 43 to Grande Prairie,
- points west and north via the Alaska and Mackenzie Highways, and
- northeast to Fort McMurray and Alberta oil sands development via Highway 63.

Edmonton’s Anthony Henday Drive ring road, provides easy access to all major highways and is aligned to support intermodal service to and from both Canadian National (CN) and Canadian Pacific (CP) major rail and intermodal sites.

In 2014, Edmonton’s International Airport (EIA) moved close to 40 million kilograms of freight with a total economic output of $2.2 billion dollars. As a major connection to global markets, EIA offers:

- employment to 12,600 workers
- opportunity for foreign investment as a designated Foreign Trade Zone
- 24/7 year-round access with no operational or noise restrictions,
- some of Canada’s lowest aviation fees, warehousing, handling charges, fuel costs and trucking rates,
- rapid customs services and bonded warehousing for international cargo,
- runway and aprons that can accommodate the world’s largest cargo aircraft such as the AN124,
- easy access to rail linkages and Highway 2 south to the U.S. markets and Anthony Henday Drive to connect to key northern and western Canadian markets.

Air cargo services are available from:

- 11 airlines,
- eight integrated couriers/freight carriers,
- three independent cargo handlers,
- more than 45 freight forwarders and customs brokers, and
- five cargo-handling terminals including three with coolers/freezers.

Air passenger service continues to grow, nearing with 7.3 million in 2014.4 Recent expansions to trans-border facilities offer expanded capacity to serve key U.S. markets.

1 City of Edmonton, 2015
2 Government of Alberta Transportation and Industry Profile, June 2016
4 Transportation & International Logistics Industry Profile and About the Industry, Government of Alberta, www.albertacanada.com
5 International Trade Data fro International Trade Division, Statistics Canada, 2012
7 Edmonton International Airport Authority, 2014
8 http://corporate.flyeia.com
CN and CP operate approximately 9,600 route kilometers in Alberta and transport in excess of 60 million tonnes into and out of the province. These two Class 1 transcontinental rail carriers link products to both west and east coast ports and through the U.S. Midwest to selected U.S. markets and the gulf coast ports.

Within the Greater Edmonton area, the railways offer 16 rail intermodal and storage facilities. They provide the capacity to move commodities such as grain and a range of oil and gas and petrochemical products and containers.

CN’s Walker Yard, located in north Edmonton and bordering on the Yellowhead Highway and Anthony Henday Drive, is one of the largest rail yards in the West, extending 50 blocks. Its 1,600 skilled workers handle an average of 3,000 rail cars/day and operate around the clock.1

The Walker Yard is the southern terminal for rail service to Fort McMurray and the first major urban supply centre along the northern line from the port at Prince Rupert, Canada’s closest deep water port to Asia.

CP is currently relocating and expanding its current Southside Intermodal Facility. The new, state-of-the-art facility will be located on a 240-acre site closer to the Edmonton International Airport, providing easy access to Highway 2 south.2

Both railways are investing millions of dollars in upgrading their facilities and lines to support the increase in demand-driven growth enjoyed in Edmonton, Alberta and Western Canada.

Edmonton transportation-related companies include:3

- Air China Cargo4
- Air Canada Cargo
- Canadian North Airlines
- CN Rail
- CP Rail
- Cratex
- FedEx
- Katoen Natie
- Reimer Express Lines
- Rosenau Transport
- Mammoet Canada Western Ltd.
- Westcan Bulk Carriers
- MTE Logistix Edmonton Inc. Westcan Bulk Carriers

1 “We’re a big part of your community” brochure (CN Partners in Responsible Care)
2 Edmonton intermodal facility public information session, CP Rail website
3 Hoovers Database January 2012 and EEDC 2013
4 Shanghai Daily News July 2015
Transportation and logistics opportunities

This sector is intricately linked to the supply and servicing of Alberta’s and northern Canada’s resource sector, its robust construction sector and the consumer needs driven by record population growth.

Highway 63, the main access road to the Athabasca oil sands area, currently carries the highest tonnage per kilometer in the country and the largest and heaviest loads carried anywhere. The Government of Alberta has commenced a series of projects designed to twin the highway and expand the parking and staging areas along this 244-kilometre route. This will expand the capacity to safely move large and heavy loads between Edmonton, Fort McMurray and various northern mine sites.1

With ongoing public and private transportation infrastructure investments, and double digit year-over-year growth, Western Canada accounts for nearly 60% of Canada’s rail freight loadings.2 Growing volumes and the multi-market access from Edmonton re-enforces the growth potential for Edmonton in the transportation and logistics sector for the near and long term.

A strong domestic market for products strengthens the business opportunity by minimizing the distances hauled, currency fluctuations and customs and brokerage costs. Locating in Edmonton provides close and convenient access to the resource customer base without compromising the ability to connect to targeted global markets.

Edmonton is ideally placed on the aircraft highway with numerous aircraft moving daily en-route to Asia and Europe from the U.S. Edmonton International Airport is uniquely positioned as a service centre and cargo consolidation point for these intercontinental cargo flights and is enjoying growth from major international carriers such as FedEx.

Edmonton offers a stable and low-cost source of aircraft fuel as a result of jet fuel refineries in the region and, most often, the lowest diesel prices at the pump in Western Canada.3

Strategically located in each quadrant of the city and connected by road, rail and air, Edmonton’s industrial locations serve any transportation, warehousing and distribution needs.

The distribution and warehouse cluster located in northwest Edmonton still has room to grow and, with the imminent completion of the final east leg of Edmonton’s ring road, the industrial locations in Edmonton’s northeast and south quadrants can easily serve any market region.

Transportation and logistics sector workforce and training

Examples of 2016 labour rates in this sector4

<table>
<thead>
<tr>
<th>Position</th>
<th>Edmonton Hourly</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transportation manager</td>
<td>$41.95</td>
</tr>
<tr>
<td>Technical sales specialist</td>
<td>$40.33</td>
</tr>
<tr>
<td>Truck driver</td>
<td>$28.75</td>
</tr>
<tr>
<td>Railway &amp; motor transport labourers</td>
<td>$23.67</td>
</tr>
</tbody>
</table>

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1 Transportation Fact Sheet, The Oil Sands Developer Group
2 Statistics Canada, Railway Car Loadings, April 2013
3 The Economics of Petroleum Refining, canadianfuels.ca
4 www.WAGEinfo, 2016 Alberta Wage and Salary Data
University of Alberta

- Offers a Bachelor of Commerce with a major in Distribution and Management

Northern Alberta Institute of Technology (NAIT)

- Business administration and information technology baccalaureate and applied degrees
- Apprenticeship training in 34 trades including the full range of trades required to maintain and operate major transportation equipment

MacEwan University

School of Business offers a Supply Chain Management Coop major and a range of transportation and logistics-related areas including:¹

- Supply Chain Planning and Process Management
- Production Planning and Scheduling
- Transportation Management
- Business Logistics Management
- Global Sourcing and Logistics
- E-business Execution
- Business Negotiations and Supplier Management
- Asia Pacific Studies

Private-sector training:

- Alberta Big Rig Driver Education
- Capilano Truck Driver Training Institute
- Gennaro Transport Training

Local transportation and logistics support organizations:

- Alberta Motor Transport Association – Edmonton
- Supply Chain and Logistics Association of Canada – Edmonton
- Alberta’s Industrial Heartland (rail)

Transportation and logistics sector competitive position

Edmonton’s competitive advantage in the transportation and logistics sector is due to its:

- proximity to a large and growing domestic customer base in Alberta and northern Canada,
- growing local market for imports from Eastern Canada, U. S. and Asian markets – ensuring both import and export potential,
- favourable fuel (aviation and diesel) costs,
- network of existing and expanding modern rail and road infrastructure,
- 24/7 international airport with modern cargo services that can handle products from perishables to oil rigs and expanded passenger service facilities,
- access to a wide range of well-connected industrial land primed for development,
- skilled and cost-effective labour force, and
- cost-competitive position compared with other Western Canadian centres serving the resource markets.

¹ MacEwan School of Business, 2013
Environmental Engineering Sector

Edmonton’s global reputation for excellence in waste management, water and wastewater and land and water remediation technologies forms the backbone of the environmental products and services sector. With this sector closely aligned to Alberta’s oil and gas industries, the potential is strong and the future bright.

Sector snapshot

The world is demanding significantly greater environmental stewardship from industry and the public sector, and the global ‘green’ economy is worth over $4 trillion.¹

The environmental focus on Alberta’s oil and gas sector has resulted in a robust, and growing, environmental products and services sector within Edmonton.

Edmonton’s core strengths are in waste management, water and wastewater treatment, carbon capture and storage and land and water remediation technologies.

Sector firms offer a wealth of marketable consulting services, technology development and specialty products.

Sector growth has been driven by the continuing expansion of Alberta’s energy sector, public policies to protect the environment, new regulatory frameworks and increased public and private sector funding.

The Government of Alberta, either directly or through a range of government supported agencies such as C3 and Climate Change and Emissions Management (CCEMC) Corporation, supports the development and implementation of strategies that reduce the negative environmental consequences of energy production and the conservation and efficient use of CCEMC, the Government of Alberta has committed $2 billion to support large-scale storage projects designed to help reduce greenhouse gas (GHG) emissions.²

Edmonton is a leader in development of innovative waste management processing and technologies.

Canada and Alberta’s environmental products and services sector in brief:

- Canadian green technology and services sector is projected to grow from $2.3 billion in 2010 to $28 billion by 2020.³
- Alberta is home to more than 1,330 companies with revenues of over $2.8 billion.⁴
- Alberta re-invests its carbon tax to fund research and pilot projects designed to stimulate transformational change through investments in climate change knowledge, clean technology development and operational deployment.⁵
- Alberta leads national expenditures in environmental protection activities relating to its resource sector.⁶
- Alberta’s oil and gas sector had the highest operating expenditures for environmental protection, reporting over $2 billion in site reclamation, decommissioning and pollution prevention processes.⁷
- Alberta’s workforce, with significant depth in engineering and expertise in natural resources planning and management, aligns well with skills needed for this growth sector.⁸
- Alberta is home to the largest remediation conference in Canada.

¹ Greening the Economy, Federal-Municipal Policy Alignment, David Thompson, Sustainable Prosperity, 2013
² http://www.solutionsstarthere.ca/24.asp
³ Greening the Economy, Federal-Municipal Policy Alignment, David Thompson, Sustainable Prosperity, 2012
⁴ Environmental Products and Services Profile, Province of Alberta 2013
⁵ http://ccemc.ca/about/
⁶ Statistics Canada, Environmental Protection Expenditures in Business Sector, 2010
⁷ Statistics Canada, Environmental Protection Expenditures in Business Sector, 2010
⁸ The Green Jobs Map, ECO Canada, 2012
Environmental engineering and service opportunities

The Alberta oil sands and energy sector’s environmental challenges and renewed public and private commitment to mitigate environmental impacts from resource extraction and processing offer strong potential for Edmonton’s environmental products and services sector.

In this sector enterprises are harnessing new technologies to better manage, mitigate and remediate the footprint made through oil sands extraction, transportation and processing. Examples of some of the areas of endeavour include:

- land remediation planning, design and implementation,
- a wide range of environmental assessment and monitoring related to air, water, habitat, etc.,
- alternate drilling and extraction technologies designed to minimize environmental impacts,
- water conservation and industrial water treatment,
- mine and tailings pond reclamation,
- pipeline flow efficiency, and
- low-pressure lifting technologies.

Edmonton’s environmental products and services sector in brief:

- Over 52 professional consulting engineering firms in Greater Edmonton’s environmental sector.
- Canada’s first four large-scale carbon capture and storage projects located in the Greater Edmonton area.
- The world’s first industrial-scale municipal waste-to-biofuel facility opened in 2014 and will convert 100,000 tonnes of sorted municipal solid waste into 38 million liters of ethanol annually.
- Thriving recyclable (including metals, plastics, electronics, oil, construction materials and paper products) sector that contributes both millions of dollars to the local economy and saves millions from public expenditures.
- Home to several major public and private research facilities and engineering services that pioneer land reclamation, mobile thermal soil remediation and greenhouse gas emissions.

Edmonton environmental and engineering service-related companies include:

- Aecom Canada Ltd.
- Al-Terra Engineering Ltd.
- AMEC Americas Ltd.
- Arrow Engineering Inc.
- Associated Engineering Alberta Ltd.
- BPTEC Engineering Ltd.
- CH2M
- CIMA+
- EBA Engineering Consultants Ltd.
- Golder Associates Ltd.
- Hatch
- IBI Group
- ISL Engineering and Land Services Ltd.
- J.R. Paine & Associates Ltd.
- Matrix Solutions Inc.
- MMM Group Limited
- Morrison Hershfield Limited
- Nelson Environmental Remediation Ltd.
- Orbis Engineering Field Services Ltd.
- Petrospec Engineering Ltd.
- Read Jones Christoffersen Ltd.
- Rice Engineering & Operating Ltd.
- Scheffer Andrew Ltd.
- Select Engineering Consultants
- SNC-Lavalin Inc.
- Stantec
- Tetra Tech EBA Inc.
- Thurber Engineering Ltd.
- Urban Systems Ltd.
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- pipeline flow efficiency, and
- low-pressure lifting technologies.

1 Consulting Engineers of Alberta, 2016
2 http://www.edmonton.com/for-business/3391.aspx
3 Edmonton Waste-to-Biofuels website, 2013
4 Consulting Engineers of Alberta, 2016
Edmonton is expected to experience a significant increase in “knowledge-based” employment – including growth in engineering and environmental services, professional and technical services, and research and development. Much of this non-population-related commercial employment growth will be associated with the energy sector.1

With Edmonton’s growing international reputation for excellence in waste management, water and wastewater treatment and the development of climate change solutions, these specialties are likely to lead the way in growth potential. A prime location for siting environmental engineering and technology businesses is Edmonton’s largest eco-industrial park, the Edmonton Energy and Technology Park (EETP).

Edmonton Energy and Technology Park

Located in Alberta’s Industrial Heartland, the City of Edmonton is facilitating the development of this park to take advantage of the huge potential for refining the by-products from oil sands production (the residual feedstocks) into consumer and industrial products. Designed as a key location to support and service the needs of the petrochemical and oil sands processing, the park:

- is situated only 15 kilometers from existing and proposed upgrader sites,
- covers approximately 4,857 hectares of largely vacant land,2

Environmental sector workforce, training and R&D

Examples of 2016 labour rates in this sector are:3

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<thead>
<tr>
<th></th>
<th>HOURLY</th>
</tr>
</thead>
<tbody>
<tr>
<td>Environmental auditor</td>
<td>$43.31</td>
</tr>
<tr>
<td>Hazardous waste management technologist</td>
<td>$43.34</td>
</tr>
<tr>
<td>Biologist</td>
<td>$45.86</td>
</tr>
<tr>
<td>Soil scientist</td>
<td>$52.85</td>
</tr>
<tr>
<td>Agrologist</td>
<td>$37.52</td>
</tr>
<tr>
<td>Environmental engineer</td>
<td>$48.84</td>
</tr>
<tr>
<td>Chemical engineer</td>
<td>$58.32</td>
</tr>
</tbody>
</table>

- includes precincts planned for sector-specific industrial operations including manufacturing with 855 net hectares and R&D, education and services with 439 net acres, and
- will use an “eco-industrial development” model where companies will share utilities, use cleaner alternative energy sources, reduce water use and waste, preserve natural areas and implement sustainable building practices.

University of Alberta

- Faculty of Agricultural, Life & Environmental Sciences
  - attracts over $35 million annually in research funding
  - over 1,800 students and 110 faculty members
- Faculty of Engineering - Top 5% of North American engineering faculties
  - features over 6,000 students, over 200 professors and 50 research chairs
  - attracts over $65 million annually from external sources for sponsored research funding
  - about 30 professors and 300 researchers are conducting water-related research

2 "Horsehills Area Structure Plan, City of Edmonton
3 www.WAGEinfo, 2016 Alberta Wage and Salary Data
Northern Alberta Institute of Technology (NAIT)

The School of Sustainable Building and Environmental Management:

- Centres include:
  - NAIT’s Centre for Chemical Studies
  - Cenovus Centre for Power Engineering
  - the new NAIT Centre for Sustainable Energy Technology

- Programs include:
  - building environment
  - environmental design
  - environmental management
  - natural resources

- The School’s Department of Physics also includes study in environmental matters

Research highlights:

**Edmonton Waste Management Centre of Excellence**

The Edmonton Waste Management Centre of Excellence (EWMCE) is a not-for-profit corporation established to meet solid waste and wastewater challenges worldwide.

The Centre includes state-of-the-art research, demonstration and education facilities and engages in:

- technology development with a mix of pilot and commercial-scale facilities, real-time access to waste streams and close linkages to expert researchers,
- research covering the spectrum of waste management,
- education and training that delivers scientific and applied knowledge to individuals or corporations, and
- advisory services to offer technical advice and project management in all areas of waste management.

University of Alberta

Faculties, centres and institutes doing research in energy and the environment:

- School of Energy and the Environment
- Canadian Circumpolar Institute
- Helmholtz Alberta Initiative
- Imperial Oil-Alberta Ingenuity Centre for Oil Sands Innovation
- Oil Sands Tailings Research Facility
- Centre for Earth Observation Sciences
- Canadian Centre for Clean Coal/Carbon and Mineral Processing Technologies (C5MPT)

**Alberta Innovates – Energy and Environment Solutions**

This agency is a catalyst for developing innovative, integrated ways to convert Alberta’s natural resources into market-ready, environmentally responsible energy. Alberta’s lead agency for energy and environmental research and innovation focuses on four areas:

- environmental management (primarily carbon capture and storage technologies, oil sands tailings and water management, and enhanced ecology),
- energy technologies,
- renewable and emerging resources such as the Edmonton municipal bio-waste project, and
- water resources.

**Alberta Innovates - Bio Solutions**

This arm of Alberta’s innovation system leads the way in finding new, innovative uses for renewable wood or agricultural fibres. Projects currently underway are exploring the development of green biocomposite building products including high-strength, light-weight foam core sandwich structure, low-cracking concrete, high-performance cross-laminated timber panels and structural insulated panels from oriented strand board.
support to entrepreneurs as they move products towards commercialization.

More than 900 clients are supported by over one million square feet of laboratory, pilot plant, scaled-up office and collaboration space.

In 2009, AITF launched an industry-directed consortium, Materials and Reliability in Oil Sands (MARIOS), to significantly reduce downtime and improve operational reliability and productivity in the oil sands industry. The consortium links oil sands producers, materials and equipment suppliers, fabricators and technology providers to collaboratively solve industry-wide problems.

Other R&D facilities in the Edmonton region include:1

- The CanmetENERGY Research Centre – focuses on reductions in greenhouse gases, water consumption and other impacts of energy production
- The Climate Change and Emissions Management Corporation - focuses on clean coal, water-based oil sands extraction, mineral processing and carbon capture
- C-FER Technologies – a leading applied research facility providing the private sector with innovative engineering and technology testing facilities
- Syncrude Research at Edmonton Research Park – pioneering the creation of fen wetlands as part of oil sands reclamation

Local sector support organizations:

- Alberta Clean Technology Industry Alliance
- Alberta Environmental Network (AEN)
- Alberta Innovates – Energy and Environment Solutions
- Alberta Plastic Recycling Association (APRA)
- Alberta Recycling Management Authority (ARMA)
- Alberta Used Oil Management Association (AUOMA)
- Association of Professional Engineers and Geoscientists of Alberta (APEGA)
- Beverage Container Management Board (BCMB)
- Clean Air Strategic Alliance
- Environmental Services Association of Alberta (ESAA)
- Innovative Energy Technologies Programs (Alberta Energy)
- Recycling Council of Alberta (RCA)
- Solar Energy Society of Alberta
- Solid Waste Association of North America (SWANA) – Canadian Prairie Chapter
- Technology Assistance Programs for Alberta Environmental entrepreneurs

1 http://www.edmonton.com/for-business/3391.aspx

Environmental sector competitive position

Edmonton offers several competitive advantages to enterprises in this sector. Top on the list are:

- Edmonton’s outstanding environmental research facilities,
- a significantly sized labour pool of highly educated talent,
- strong post-secondary programs that maintain and grow the labour pool,
- a strong and committed customer base,
- a very cost-competitive operating environment, and
- regulatory regimes that ensure improved environmental outcomes.

These advantages are well illustrated by the 2016 Competitive Alternatives Report by KPMG with Canada ranking second among top 10 countries, with business costs 14.6% lower than in the United States.

Edmonton offers access to a range of business park and research and development (R & D) facilities including lease and development opportunities at the Edmonton Research Park and prime development locations at the Edmonton Energy and Technology Park (EETP) with nearly 440 net hectares (924 acres) designated for R & D, education and service operations.

Edmonton offers cost competitive leasing and development opportunities for consulting services and R & D operations.

For those office-intensive operations, Edmonton offers:

- very competitive office property rates; current Class A net downtown rental rates of approximately $25.36 per square foot located within the City of Edmonton are lower than other major western Canadian cities such as Calgary and Vancouver by as much as 40%.2
- city-wide transit service, and
- a full range of services needed to support research and consulting businesses.

1 http://www.costivealternatives.com/reports/2014
2 Market Outlook 2013 at a Glance, CBRE
Canadians understand that a healthy environment and a strong economy are not competing priorities. Now is the time for Canadian companies to capture their share of the global market for clean technology. From waste management to biofuels to greener solutions for the oil and gas industry, these Canadian companies are leading the world in intelligent, environmentally responsible and economically sound solutions in a number of key economic sectors.

- The Honourable Navdeep Bains, Minister of Innovation, Science and Economic Development.
Clean Technology: Definition

Clean technology (cleantech) is a general term used to describe products, processes or services that reduce waste and use a smaller environmental footprint requiring smaller quantities of non-renewable resources.

Cleantech includes a product or service that enhance operational performance and productivity, reduces costs, improve energy efficiency and consumption, pollution control, waste reduction and enhances carbon mitigation and profitability. ¹

Cleanech processes and technologies include recycling, renewable energy, wind power, solar power, biomass, hydro-power, biofuels, information technology, green transportation, electric motors, green chemistry, lighting, greywater, and many other appliances that encourage energy efficiency.²

Clean Technology: Drivers

There are several drivers moving industry to clean technology products and processes:³

- higher cost of conventional technology
- cost savings and co-benefits of clean technology
- capital being invested in research and development by large corporations
- a competitive global marketplace
- a change in consumer attitude has brought environmental concerns into the mainstream

Everyone will benefit from the advancements in solar and wind power, biofuel research, water filtration, grid management and transportation when the cost of clean technology becomes more competitive. These incude reducing impact on climate change, creating new clean tech jobs, competing internationally by developing new technologies, savings through improved energy efficiencies for businesses and households, preserving vital ecosystems and species and conserving natural resources.⁴

Canada’s Cleantech Story

At the national level, cleantech revenues have been growing at a rate four times faster than the Canadian economy, according to a report from Analytica Advisors where industry revenues totaled $12 billion at the end of 2014.¹

Based on the work at Analytica Advisors, cleantech is projected to overtake Canada’s aerospace industry and grow from the $12 billion industry today to a $28 billion industry by 2022.²

The Minister of Innovation, Science and Economic Development, announced over $206 million in funding for 36 clean technology projects across Canada for 2016.³

Investing in innovation, supporting clean technology and encouraging sustainable practices will help create jobs, expand access to international markets and make Canadian companies more competitive in the global economy.

Sustainable Development Technology Canada (SDTC) provides funding and support for clean technology companies at a critical point in the innovation process. It allows innovators to develop and demonstrate their technologies prior to entering the market.

To stay competitive, Canada must lead the way in innovation and embrace opportunities to create the clean jobs of the future. The Government of Canada will continue investing in innovative clean technology projects that grow local economies and promote environmental sustainability.

² http://ccemc.ca/ccemc_news/cleantech-directions-2016-report
³ https://www.sdtc.ca/en/MarchFundingAnnouncement
⁴ http://alberta.gov.ca/about-us/
⁵ Oilsands Alberta http://oilsands.alberta.ca/researchtechnology.html
Alberta’s Cleantech Story

Alberta Innovates is uniquely positioned to identify and nurture the research and innovation ideas that will keep Alberta relevant and competitive in the global marketplace. It contributes to a sustainable and diversified economy preparing for a low-carbon future with advancement of medical knowledge, treatment and best clinical practice.¹

Economic prospects for Alberta are still positive even with the economic downturn. International demand for energy exports and investments in the oil sands drive services in other related sectors.²

Venture capital activity for emerging (non-oil and gas) sectors is difficult to assess. Growth in these sectors in Alberta are among the lowest in the world and rates for business expenditures on research and development (R&D) are lower than the national average.

Alberta is highly dependent on energy exports and American markets. Diversification in the non-oil and gas sectors in Alberta will be focused in key sectors:

Alberta’s clean technology (cleantech) sector consists of companies that primarily work in process efficiency and abatement, power generation as well as recycling and waste. Alberta’s cleantech sector is dominated by smaller firms that face challenges such as restricted access to capital and a slow domestic market.

The cleantech sector experiences difficulties in growing and staying competitive globally; however the oil sands operations, which have an increasing focus on environmental mitigation, provide local cleantech companies in this sector opportunity for growth in Alberta.

Support for the sector in the province is provided through various initiatives such as the Climate Change and Emission Management Corporation, which provides funding to firms Information and Communication Technology (ICT)

Alberta is home to over 4,238 ICT firms, employing over 53,200 people with revenues for this sector totalling $10 billion in 2010.³

Provincial firms have a strong presence in industrial automation, manufacturing and controls software, medical imaging, bioinformatics, geomatics, new media and gaming.

In the future, a challenge for ICT involves expected labour shortages due to low enrollment in ICT-related fields and the departure of skilled labour from ICT to meet the needs of the oil and gas sector.

Life Sciences / Medical Devices

Alberta’s Life Sciences sector is comprised of more than 150 companies, with the majority located within the Edmonton and Calgary regions and operating in the health biotechnology and medical devices and equipment sectors.

The province is home to several premier research entities, including the University of Alberta, the University of Calgary and the National Institute of Nanotechnology (NINT).²

Despite the presence of these facilities, Alberta firms in the sector spend less on R&D compared to firms operating in other parts of the country.

Additionally, the sector suffers from a lack of effective coordination between stakeholders, thereby impacting the sector’s potential.

Nanotechnology / Micro-technology

In addition to the more than 70 nanotechnology companies operating in the province, Alberta has substantial capacity to further the sector’s growth.³

This includes significant research capabilities largely centered on the NINT at the University of Alberta and specialized facilities such as the Alberta Centre for Advanced MNT Products, which provides support for translating research into end-market use.⁴

Leveraging these assets, the Government of Alberta has a strategy aimed at capturing $20 billion of the worldwide nanotechnology market annually by 2020.

The new policies in Alberta, which include a $20-per-tonne carbon tax in 2017 that increases to $30 per tonne in 2018, create a need for some of the smaller players in the cleantech sector to gain a lot more traction in the province by assisting oil and gas companies in reducing their emissions.

“I’ve seen a significant paradigm shift over the last couple of months working in the oil and gas sector and speaking to leaders who, five years ago, saw this as a compliance exercise. Now oil and gas companies in Alberta see clean-tech investments as a way to save rather than spend money, which creates an opportunity for the clean-tech sector and should also lead to an overall reduction in greenhouse gas emissions in the province”⁴

- Meghan Harris-Ngai, Ernst and Young energy market leader for climate change

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¹ albertainnovates.ca/about-us/
² Oilsands Alberta oilsandsalberta.ca/researchtechnology
³ economic.alberta.ca/CT.aip
⁴ http://www.financialpost.com/m/wp/blog.html?b=business
To be successful in Alberta, which has been hit hard by the collapse in oil price, Harris-Ngae from Ernst and Young said cleantech companies will need to demonstrate they can help oil and gas companies reduce their emissions and do so at the lowest possible cost.

To meet the new requirements, energy companies are turning to the clean technology sector, poised to be one of the few growth sectors in Alberta during the economic downturn.

More than $398 million has been collected for a clean energy technology fund, which will be invested to develop ways to cleanly develop resources.

Funds are administered through the Climate Change and Emissions Management Corporation and awarded to projects within the province. The Alberta government is investing $25 million into Carbon Management Canada, a national, university-led research network.

Edmonton’s Cleantech Story

Edmonton’s Cleantech Economy
Edmonton is well positioned to accommodate clean technology sector business opportunities.

“Edmonton is recognized as an economic powerhouse, maximizing the diversity of its economic advantages, including its location as a portal to the North; as the urban centre of regional industrial development; as a knowledge and innovation centre for value added and green technologies and products; and as a place that attracts and supports entrepreneurs.”
- The Way Ahead Strategic Plan

Edmonton has been able to capitalize on opportunities in emerging industries related to the energy and resource sector which includes professional expertise in clean technologies including environmental remediation and consulting, water treatment, renewable energy, cold weather construction, and waste management. The City of Edmonton uses best practices and has earned a reputation as the most business-friendly community in Canada. Businesses are thriving in an environment of efficiency and collaboration created by the City and the business community’s shared entrepreneurial spirit. In partnership with industry and educational institutions, Edmonton leads the advancement of commercialization of new products and services.

Enerkem a Cleantech Edmonton Company

Enerkem has developed a $12.5 million waste-to-biofuels facility located at the Edmonton Gold Bar facility and has been named a global energy technology leader by Cleantech Group, a global energy and environment research firm.

The Montreal-based biofuel company was named to the top 100 list after 75 clean technology experts from around the world reviewed companies that are most likely to make a significant impact on the industry over the next five to 10 years. More than 8,000 companies from 85 countries were nominated.

The facility is a leader in developing technologies that converts non-hazardous waste from the oil and gas, agricultural, forestry and municipal sectors into green transportation fuels and chemicals, while reducing greenhouse gas emissions.

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1 financialpost.com/m/wp/blog
2 Millier Dickinson Blais: The Way We Prosper
3 http://enerkem.com/facilities/enerkem-alberta-biofuels/
Edmonton’s Clean Technology Companies
(Source: ABCtech Business Directory)

• Accent Free Inc.
• Akshaya Bio Inc.
• Allan R. Nelson Engineering (1997) Inc.
• Bodhi Solutions
• CanBiovicin Inc.
• Carlisle Consulting
• Cedar Waxwing Group
• Clearthink Group
• Donnelly & Co. LLP
• EARA Technologies Inc
• Emergence by Design Inc.
• EnSegs Inc.
• Gaetz Realty Inc.
• Great Big Solutions Ltd.
• High Level Analytics Inc.
• Howell Mayhew Engineering
• IBI Group
• Imagenterra
• Kevin Keough Consulting Inc.
• Kunal Dhawan
• Livestock Gentec
• Maine Consultants Ltd.
• Mediashaker
• Michel Herszak
• Nissen Patent Law
• Quantum Technologies Inc.
• REACH-Consulting Ltd
• Reflex Enterprise Solutions Group Inc.
• Riva, International Inc.
• RUN-WithIT Inc.
• SBI BioEnergy Inc.
• Serious Labs Inc.
• ServiceControl, Inc.
• SinoVeda Canada Inc.
• SITECH Western Canada
• SkyFire Energy Inc
• Spieker Point Inc.
• Sterling Lifestyle Solutions (Canada) Inc.
• Stormboard
• Stream Technologies Inc
• Taleron Technologies Corp.
• Videre Analytics Ltd.
• Visionstate Inc.
• Zedi Inc.
• Zipnet Design

Edmonton’s Energy Transition Strategy
Across Canada, Edmonton is rapidly becoming known as an energy sustainable city. Over the past decade, we have launched innovative community projects that conserve energy, use energy more efficiently and reduce greenhouse gas (GHG) emissions. ¹

Our most widely recognized successes include:
• Expansion of Edmonton’s LRT network;
• Planning, design and development of world-class sustainable communities like Blatchford, The Quarters, Downtown and transit oriented developments;
• Introduction of energy efficient street lighting technologies;
• Advancement of infill strategies;
• Establishment of a large commercial-scale waste-to-biofuels facility and;
• Advancement of fresh: Edmonton’s Food and Agriculture Strategy.

Edmonton’s Community Energy Transition Strategy responds to City Council’s goal for Edmonton to go even further and become “the nation’s leader in setting and achieving the highest standards of environmental preservation and sustainability both in its own practices and by encouraging and enabling the practices of its partners.” Equally, it responds to three of the twelve Council-approved goals in the City of Edmonton’s environmental strategic plan, The Way We Green:

CITY GOALS:
1. Edmonton’s sources and uses of energy are sustainable.
2. Edmonton is resilient to disturbances that could affect its energy supplies and distribution systems.
3. Edmonton is a carbon-neutral city
Achieving these goals is vital to our quality of life and our aspiration to be a great global city. Moreover, their achievement will help protect us from major climate and energy risks and position us for exciting opportunities as the world transitions to cleaner energy.

The energy sustainable Edmonton reflected in this strategy includes:

- Energy literate citizens with energy conserving lifestyles;
- World-class energy efficiency in all types of buildings;
- World-class energy efficiency in industrial processes;
- A strong shift to active and public transportation as preferred modes of travel;
- An urban form that is carefully designed to avoid unnecessary energy use and optimize free energy from the sun;
- Greener electricity from Alberta’s electricity grid and local generating facilities;
- A greater portion of electricity produced close to where it is used through district energy systems, combined heat and power systems and renewable and alternative energy technologies;
- Increased electrification of Edmonton’s transportation system with passenger vehicles, buses, light trucks and trains powered by clean electricity.

Edmonton’s Community Energy Transition Strategy points Edmonton to an energy sustainable future. It is a framework for policymakers to take action.

Edmonton’s Energy Transition Strategy - Opportunity

**Hard Truth #1**
The world’s demand for energy is growing fast. By the middle of this century there could be over nine billion people using twice as much energy as we use today.¹

Of the 170,645 TJ of energy consumed in Edmonton in 2012, natural gas provided the main source of energy (42%) followed by gasoline, diesel fuel and electricity.

Edmonton’s Energy Consumption by Energy Type (2012) used four general sectors: residential buildings, commercial buildings, industry and transportation.

Of the total energy consumed in Edmonton the biggest user at 41.8% is the transportation sector It is followed by large/commercial buildings at 22.5%, residential buildings at 19.4% and industrial buildings and processes at 16.2%.

**Hard Truth #2**
Global energy supply will struggle to keep pace. There are still large amounts of hydrocarbons in the ground, but what’s left tends to be concentrated under very deep oceans and very thick ice.

Over the past century, fossil fuels have provided most of the world’s energy. In 1973, 94.1% of the world’s energy came from fossil fuels. In 2012, this figure stood at 81.3% with 36.1% from oil, 25.7% from natural gas and 19.5% from coal.

Predicting the world’s future fossil fuel production and supply requires technical analysis and forward thinking about where this energy will come from.

Forecasts agree the world’s energy mix will remain heavily weighted toward fossil fuels in coming decades:
- The IEA anticipates that fossil fuels will constitute 76% of the world’s energy mix by 2035; and
- The U.S. Energy Information Administration anticipates that fossil fuels will constitute 78% of the world’s energy mix by 2040

**Hard Truth #3**
Without a change in global policies, environmental stresses will continue.

In 2013, the IEA published a special report titled Redrawing the Energy-Climate Map. Its key message was that the world is not on track to limit the long-term rise in the average global temperature of 2°C. Current policies are leading the world to a long-term average temperature increase in the range of 3.6°C and 5.3°C.

Despite this trend, the IEA noted that the 2°C target was still technically feasible through global actions including:
- Adopting specific energy efficiency measures (40% of the potential emissions savings).
- Limiting the construction and use of coal-fired power plants (21% of the potential emissions savings).
- Minimizing methane emissions from upstream oil and gas production (18% of the potential emissions savings).
- Accelerating the partial phase-out of subsidies to fossil fuel consumption (12% of the potential emissions savings).

¹ [https://www.edmonton.ca/city_government/documents/](https://www.edmonton.ca/city_government/documents/)
Energy Transition – The Opportunity

The diagnosis to this point has focused on risks to Edmonton if the world becomes more energy constrained and impacted by climate change. Based on this diagnosis, the strategy takes the position that there is a high probability the world will need to find new energy sources to replace oil and natural gas in this century as they become more scarce and expensive.

The challenge associated with replacing so much of our current energy mix with renewable and alternative energy sources is enormous. Arguably, it represents the most profound global transformation of the 21st Century.

While Edmonton’s Community Energy Transition Strategy\(^1\) points to future risks, an equally important message is that:

- Energy transition is the golden opportunity of our age;
- Those who respond to the challenge with innovative solutions will prosper most and;
- Few places are better positioned than Edmonton in terms of knowledge, experience and financial capacity to lead and excel in this area.

Clean Technology Sectors\(^2\)

**Sector: Environmentally Friendly Energy & Energy Storage**

Application: Power Generation and Renewable Energy Technology:
- Photovoltaic Energy
- Solar thermal Energy
- Geothermal Energy
- Wind Energy
- Bioenergy
- Sewage Gas

Application: Environmentally Friendly Use of Fossil Fuels Technology:
- Combine cycle power plant
- Cogeneration plants
- High performance power plants
- Co2 reduced power generation

Application: Storage Technologies Technology:
- Mechanical storage
- Electrochemical storage
- Electrical storage
- Thermal storage

Application: Efficient Grids Technology:
- Smart grid
- Local and district
- Heat grid

Sector: Circular Economy\(^2\)

Application: Waste Collection and Transport Technology:
- Infrastructure Waste Separation & Sorting

Application: Waste Utilization Technology:
- Recycling
- Thermal waste treatment

Application: Waste Disposal Technology:
- Safeguarding & removal of contaminants
- Hazardous waste reduction
- Utilization of land fill gas

Application: Environmental Remediation Technology:
- Ecological Restoration
- Land rehabilitation

**Sector: Sustainable Water Management\(^1\)**

Application: Water Procurement & Treatment Technology:
- Ground water monitoring
- Water purification

Application: Water Utilization Technology:
- Components of water distribution system
- Water distribution grid

Application: Efficiency increases in Water Utilization Technology:
- Water efficient technology in the residential sector
- Water efficient technology in the commercial sector

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2. 2013 by DCTI, EuPD Research and KPMG in:  
CleanTechandortgutachten 2013 in Anlehnung an BMU Roland Berger 2012
Sector: Sustainable Mobility
Application: Alternative fuels
Technology:
- Biofuels
- Natural gas
- Hybrid drive
- Electrical drive
- Fuel cell drive
Application: Alternative Drive
Technology
Technology:
- Efficient combustion engines
- Environmentally friendly vehicle design
Application: Material Efficient Processes
Technology:
- Optimization of existing processes
- Utilization of new materials
- Reduction of operating supplies
Application: Sustainable Design Management
Technology:
- Car sharing
- Vehicle fleet management

Sector: Resource & Material Efficiency
Application: Cross-Sectional Technology
Technology:
- Biotechnology
- Nanotechnology
- Mechanical engineering process technology
Application: New Materials Technology
Technology:
- Compound materials
- Bioplastics
Application: Material Efficient Processes
Technology:
- Optimization of existing processes
- Utilization of new materials
- Reduction of operating supplies
Application: Sustainable Design Technology
Technology:
- Eco-design
- Life cycle assessment

Sector: Energy Efficiency
Application: Industrial Specific Energy Efficient Production Processes
Technology:
- Automation & control technology
- Efficient engines
- Heat recovery
Application: Efficient Appliances Technology:
- Electric appliances
- Information and communication technology
- Illumination
Application: Energy Efficient Buildings Technology:
- Technical
- Building equipment
- Building shell
- Insulation and windows

1 2013 by DCTI, EuPD Research and KPMG in: Cleantech- andortgutachten 2013 in Anlehnung an BMU/ RolandBerger 2012
2 2013 by DCTI, EuPD Research and KPMG in: Cleantech- andortgutachten 2013 in Anlehnung an BMU RolandBerger 2012
Alberta Clean Technology Companies1

- 3D Energy
- 4Front Robotics
- AgSpectra Limited
- Ammolite Strategies Inc.
- Bow River Solutions Inc
- Cadeon Inc
- Canadian Ventures Inc.
- Carbon Credit Solutions Inc.
- C4i Training and Technology
- Deltatee Enterprises Ltd.
- DesLandes Consulting Ltd
- Dynasonic Solutions Inc
- FoundLocally.com Media Inc
- Glenn Hughes
- GOMentr Inc.
- HELIA Technologies
- Igloo Innovations Incorporated
- Innovation Consulting Ltd.
- Lexicom Ltd.
- Missing Link Ltd
- MRF Geosystems Corporation
- Neutopia ecoSOLUTIONS Inc.
- New Energy Corporation Inc.
- Nova Green Inc. (NovaGreen)
- Payload
- Portfire Associates Inc.
- Process Ecology Inc.
- Norton Rose Fulbright Canada LLP
- Osprey Informatics
- Replicon Inc
- Sacré-Davey Engineering Inc.
- Scenarios to Strategy Inc.
- Sentinel Trending & Diagnostics Ltd.
- Simple Solar
- SkyBase Solutions
- SkyFire Energy Inc
- Smoky Trout Farm Limited
- Stephdokin Digital Brand Marketing Agency
- TSGI Corporation
- VisuMap Technologies Inc
- VizworX Inc.
- Zedi Inc. (HQ)

Edmonton Associations/Agnecies/NGO’s2

- Advanced Biofuels Canada
- Agri Food Discovery Place, University of Alberta
- Alberta Agriculture and Forestry
- Alberta Clean Technology Industry Alliance
- Alberta Council of Technologies Society
- Alberta Innovates - Bio Solutions
- Alberta/Canada Fusion Energy Program
- C-FER Technologies
- Climate Change and Emissions Management Corporation (CCEMC)
- Delta Genomics Centre
- Export Development Canada
- Livestock Gentec
- Money Mentors

Alberta Associations/Agnecies/NGO’s

- Applied Research and Innovation - Red Deer College
- Lakeland College
- W21C Research and Innovation Centre
- Zymetrix

1 http://www.abctech.ca/industry-directory
2 http://www.abctech.ca/industry-directory
WEB RESOURCES
NATIONAL AND REGIONAL STATISTICS
Statistics Canada www.statcan.gc.ca

PROVINCIAL SITES – DOING BUSINESS IN ALBERTA
Alberta Government www.alberta.ca
Alberta Treasury Board and Enterprise www.treasuryboard.alberta.ca
Doing Business in Alberta www.albertacanada.com
Investing and Locating www.albertacanada.com/intl-business/establishing-a-company.html
Exporting your Products www.albertacanada.com/ab-business/exporting-your-products.html
Industry Sectors www.albertacanada.com/ab-business/alberta-industries.html
Productivity Alberta www.productivityalberta.ca
Alberta Innovates www.albertainnovates.ca
Regional Development www.albertacanada.com/about-alberta/regional-economic-development.html
Community/Market Information www.albertacanada.com/about-alberta/the-economy.html

PROVINCIAL SITES – MOVING TO AND LIVING IN ALBERTA
Alberta Energy www.energy.alberta.ca/EnergyProcessing
Immigrating www.albertacanada.com/immigration
Health Care www.health.alberta.ca
Education www.education.alberta.ca
Advanced Education and Technology www.advancededucation.gov.ab.ca

EDMONTON – LIVING AND DOING BUSINESS IN EDMONTON
City of Edmonton www.edmonton.ca
Edmonton Economic Development Corporation www.edmonton.com
Edmonton industrial land sales www.edmontonindustrialland.ca
TEC Edmonton www.tecedmonton.com
University of Alberta www.ualberta.ca
Northern Alberta Institute of Technology (NAIT) www.nait.ca
MacEwan University www.macewan.ca
Edmonton Region Immigrant Employment Council www.eriec.ca

KEY INDUSTRY SITES
Alberta metal fabricators www.albertametal.ca
Alberta’s Industrial Heartland Association www.industrialheartland.com
Strathcona Industrial Association www.sia.ab.ca
Northeast Capital Industrial Association www.ncia.ab.ca

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CANADA’S POWERHOUSE OF INDUSTRY