

Economic Impact Study of the Aggregate Industry in Alberta

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MNP
LLP

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1. EXECUTIVE SUMMARY

BACKGROUND AND STUDY PURPOSE

The Alberta Sand and Gravel Association (ASGA) represents the interests of sand and gravel operators and related organizations in Alberta on key industry-related issues and proposed regulatory changes. It also advocates for the development of environmentally responsible sand and gravel in the province. The ASGA was established in 1974 and is based in Edmonton.¹

The ASGA commissioned MNP LLP (MNP) to carry out an economic impact assessment of the aggregate industry (the industry) in Alberta.

OVERVIEW OF THE AGGREGATE INDUSTRY IN ALBERTA

Sand and gravel, also known as aggregate, is estimated to have the largest value of any non-energy mineral resource in Alberta.² In 2015, there were 216 establishments^{3,4} in the aggregate industry in Alberta, as well as 2,622 pits on private land and surface material leases on public land across the province.⁵ The value of aggregate production in Alberta was estimated at \$934 million in 2015.⁶

Table 1 summarizes the key statistics for the aggregate industry in Alberta in 2015.

Table 1: Key Statistics of the Aggregate Industry in Alberta

	2015 (Unless Otherwise Noted)
Number of Establishments	216
Number of Pits on Private Land and Surface Material Leases on Public Land (2017)	2,622
Value of Aggregate Production (\$ million)	\$934
Number of Employees	2,232
Number of Full-Time Equivalents (FTEs) ⁷	2,098

Sources: Natural Resources Canada, Alberta Ministry of Environment and Parks and ASGA

¹ Alberta Sand and Gravel Association. "About". Available here: <http://www.asga.ab.ca/about.asp>

² Ibid.

³ For statistical purposes, Natural Resources Canada defines a mining establishment as a separate operating entity capable of reporting on: materials and supplies used; goods purchased for resale in the same condition as purchased; fuel and power consumed; number of employees and salaries and wages; person-hours for employees; inventories; and shipments or sales.

⁴ Natural Resources Canada. Census of Mines, Quarries and Sand Pits, 2015 for NAICS 21232. "Principal Statistics, Metal Ore and Nonmetallic Mineral Mining and Quarrying, by Industry and Province, 2013-2015".

⁵ Alberta Ministry of Environment and Parks, Registered Pits on Private Land and SML's on Public Land, 2017.

⁶ Natural Resources Canada. Census of Mines, Quarries and Sand Pits, 2015 for NAICS 21232. "Principal Statistics, Metal Ore and Nonmetallic Mineral Mining and Quarrying, by Industry and Province, 2013-2015".

⁷ The number of employees was gathered from Natural Resources Canada, which was converted to FTEs using Statistics Canada's CANSIM 383-0033.

ECONOMIC IMPACTS

Table 2 presents the estimated economic impacts generated by the aggregate industry in Alberta based on the 2015 value of production in Alberta.

Table 2: Estimated Economic Impacts of the Aggregate Industry in Alberta, 2015⁸

	Output (\$ million)	GDP (\$ million)	Employment (FTEs) ⁹	Federal Tax (\$ million)	Provincial Tax (\$ million)	Municipal Tax (\$ million)
Direct	\$934.2	\$479.6	2,098	\$58.3	\$37.8	\$8.4
Indirect and Induced	\$590.0	\$325.9	2,022	\$38.0	\$27.7	\$7.5
Total	\$1,524.2	\$805.5	4,120	\$96.3	\$65.5	\$15.9

COMPARISON WITH OTHER INDUSTRIES

To provide perspective on the relative size of the economic impacts of the aggregate industry in Alberta, it is useful to compare the impacts of the aggregate industry with those created by other industries:

- **Residential Construction.** The total employment supported by the aggregate industry in Alberta, in 2015 (4,120) was roughly equivalent to the employment supported by the construction of 1,767 new homes in the province.¹⁰
- **Forestry.** The direct and indirect employment supported by the aggregate industry in Alberta, in 2015 (3,337), was roughly equivalent to 25 percent of the direct and indirect employment reported for the Alberta forestry sector.¹¹
- **Cattle Production.** The direct GDP generated by the aggregate industry in Alberta, in 2015 (\$479.6 million), was roughly equivalent to 50 percent of the direct GDP reported for the Alberta cattle production industry.¹²

⁸ Tax revenues include taxes on products (e.g. GST), taxes on production (e.g. licence fees, capital taxes, or property taxes), Community Aggregate Payment levies, and income taxes. Please note that because tax revenues can regularly change due to modifications in tax policy, the tax revenue impacts in this report are estimates only and are subject to change. They should be viewed as approximate in nature.

⁹ MNP used the employment reported by Natural Resources Canada's Census of Mines, Quarries and Sand Pits in 2015 for NAICS code 21232 to report on the number of direct jobs in the aggregate industry in Alberta, while the indirect and induced number of jobs in the aggregate industry in Alberta were derived using Statistics Canada's 2013 multipliers. Direct, indirect and induced jobs generated by the aggregate industry in Alberta were converted to FTEs using Statistics Canada's CANSIM 383-0033.

¹⁰ Canadian Home Builders Association, "Alberta 2016 Economic Impacts of New Home Construction." Available here: http://www.chba.ca/CHBA/Housing_in_Canada/Information_and_Statistics/impacts/1%20Alberta%20Economic%20Impacts%20of%20New%20Home%20Construction%202016.pdf

¹¹ Alberta Agriculture and Forestry. "Forestry Economic Impact Report 2012". May 2013. Available here: <https://www.albertacanada.com/AlbertaForestSector-2012EconomicImpact.pdf>

¹² University of Saskatchewan. "Economic Impacts of Livestock Production in Canada – A Regional Multiplier Analysis". September 2012. Available here: <http://www.cattle.ca/assets/Uploads/IA/1228-Final-Report-Multipliers-CCA-Oct-2012.pdf>

2. INTRODUCTION

BACKGROUND AND STUDY PUPOSE

The Alberta Sand and Gravel Association (ASGA) commissioned MNP LLP (MNP) to carry out an economic impact assessment of the aggregate industry in Alberta.

The scope of the study included:

- A high-level profile of the aggregate industry in Alberta.
- An analysis of the economic impacts generated by the aggregate industry in Alberta. The analysis quantified output, GDP, tax revenues and employment generated by the aggregate industry in 2015.

MNP'S APPROACH

In preparing this report, MNP carried out the following activities:

- Conducted research through publicly available statistics, articles, and reports.
- Collected publicly available industry statistics on the aggregate industry in Alberta from sources such as Natural Resources Canada.
- Estimated the economic impacts of the aggregate industry in Alberta using an input-output methodology with multipliers published by Statistics Canada.

REPORT LIMITATIONS

This report is provided for information purposes and is intended for general guidance only. It should not be regarded as a substitute for personalized business investment advice.

We have relied upon the completeness, accuracy and fair presentation of all information and data obtained from the ASGA and public sources. The accuracy and reliability of the findings and opinions expressed in the presentation are conditional upon the completeness, accuracy and fair presentation of the information underlying them. As a result, we caution readers not to rely upon any findings or opinions for business or investment purposes and disclaim any liability to any party who relies upon them as such.

Additionally, the findings and opinions expressed in the report constitute judgments as of the date of the report, and are subject to change without notice. MNP is under no obligation to advise of any change brought to its attention which would alter those findings or opinions.

3. OVERVIEW OF THE AGGREGATE INDUSTRY

THE AGGREGATE INDUSTRY IN CANADA

Aggregate is defined as rock products, such as sand, rocks, gravel, crushed stone, and shale that are extracted from the ground. Aggregate is an important component in the construction of roads, schools, houses, hospitals, and bridges, and is also used in the water purification process, the de-icing of roads, and the manufacture of everyday goods like paper, paint, and toothpaste.^{13,14}

In Canada, aggregates are primarily used in the construction of roads and houses. Beneath every asphalt road, there is approximately one foot of aggregate used to dissipate the load of the trucks and cars.¹⁵ This equates to approximately 30,000 tonnes of aggregate to construct each kilometre of highway.¹⁶ Aggregate is a regulated non-renewable resource and a vital component of the Canadian economy.

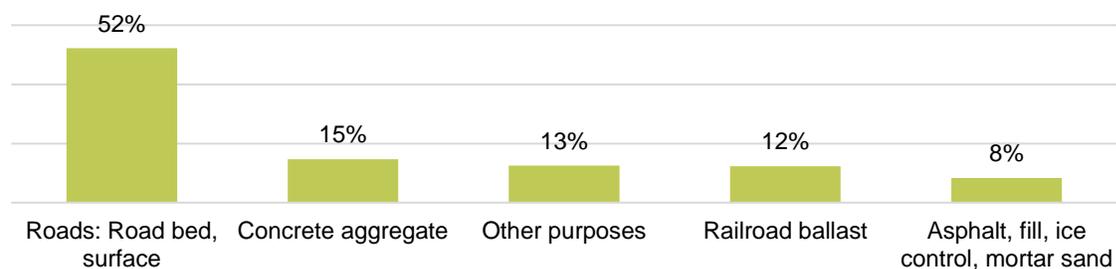
THE AGGREGATE INDUSTRY IN ALBERTA

In 2015, there were 216 establishments in the aggregate industry in Alberta, as well as 2,622 pits on private land and surface material leases on public land across the province.^{17,18} The aggregate industry is a major source of employment in the provincial economy. In 2015, the industry provided direct employment of over 2,000 individuals in Alberta, with approximately 90 percent of them engaged in direct extraction activities.¹⁹

Between 42 and 62 million metric tonnes of aggregate per year are used within Alberta, which equates to 10 to 15 tonnes per person.²⁰ This figure has increased substantially, up from approximately 3.5 tonnes per person annually 60 years ago.²¹ The value of aggregate production in Alberta was estimated at \$934 million in 2015.²²

The majority of aggregate in Alberta is used to construct roads, while the remainder of it is used in railroad ballasts, concrete, and a combination of asphalt, ice control, and mortar sand.²³ Figure 1 shows the various consumption uses of aggregate in Alberta in 2015.

Figure 1: Consumption Uses of Aggregate in Alberta, 2015



Source: Natural Resources Canada

¹³ Alberta Sand and Gravel Association. "Aggregate 101". Available here: <http://www.asga.ab.ca/resources-101.asp>

¹⁴ Ontario Stone, Sand and Gravel Association. "Publications". Available here: <https://www.ossga.com/publications/>

¹⁵ University of Minnesota. "Construction Aggregates: The Foundation of Everyday Life". June 19, 2012. Available here: <http://www.d.umn.edu/prc/MMEW/2012%20MMEW%20PPTs/Construction%20Aggregates%20MMEW%202012.pdf>

¹⁶ Alberta Sand and Gravel Association. "Aggregate 101". Available here: <http://www.asga.ab.ca/resources-101.asp>

¹⁷ Natural Resources Canada. Census of Mines, Quarries and Sand Pits, 2015 for NAICS 21232. "Principal Statistics, Metal Ore and Nonmetallic Mineral Mining and Quarrying, by Industry and Province, 2013-2015".

¹⁸ Alberta Ministry of Environment and Parks, Registered Pits on Private Land and SML's on Public Land, 2017.

¹⁹ Natural Resources Canada. Census of Mines, Quarries and Sand Pits, 2015 for NAICS 21232. "Principal Statistics, Metal Ore and Nonmetallic Mineral Mining and Quarrying, by Industry and Province, 2013-2015".

²⁰ Alberta Sand and Gravel Association. "Aggregate 101". Available here: <http://www.asga.ab.ca/resources-101.asp>

²¹ Ibid.

²² Natural Resources Canada. Census of Mines, Quarries and Sand Pits, 2015 for NAICS 21232. "Principal Statistics, Metal Ore and Nonmetallic Mineral Mining and Quarrying, by Industry and Province, 2013-2015".

²³ Ibid.

The aggregate industry is highly regulated in Alberta. For private lands, both municipal development permits, and provincial Code of Practice Registrations are required. Aggregate extraction establishments on public lands must submit Conservation, Reclamation and Business Plans to the provincial government, prior to commencing development of a pit.²⁴ This ensures that pits are mined in an acceptable manner, and through reclamation securities, ensures the lands will be reclaimed after depletion. Typically, lands are returned to their former use, whether that be natural areas or agriculture, but in unique cases can become parks, community sports fields or other tourist attractions. Additionally, municipal governments define rules around hours of operation for pits, routes for hauling and pollution and air quality measures.

Furthermore, under the Municipal Government Act, municipalities have the ability to pass a Community Aggregate Payment (CAP) bylaw that requires aggregate businesses to report the tonnage of shipments and to pay a levy of up to \$0.25 per tonne extracted.²⁵ The levy was supported by the ASGA, in consultation with the Alberta Association of Municipal Districts and Counties (AAMDC) and the Alberta Roadbuilders and Heavy Construction Association (ARHCA), to provide visible benefits to Alberta communities with sand and gravel extraction operations.²⁶ Since 2006, approximately half of Alberta municipalities have adopted the levy, and from 2006 to 2015, roughly \$71.6 million has been collected by communities with the CAP levy. In 2015, approximately \$8.3 million in CAP levies were collected, with the City of Calgary collecting the largest proportion of any municipality.²⁷

²⁴ Provided by the ASGA.

²⁵ Alberta Sand and Gravel Association. "CAP Levy". Available here: <http://www.asga.ab.ca/initiatives-cap.asp>

²⁶ Provided by the ASGA.

²⁷ Ibid.

4. ECONOMIC IMPACTS OF THE AGGREGATE INDUSTRY IN ALBERTA

ECONOMIC IMPACT ANALYSIS APPROACH

In general, economic impacts are viewed as being restricted to quantitative, well-established measures of economic activity. The most commonly used of these measures are output, GDP, employment and government tax revenue:

- **Output** is the total gross value of goods and services produced by a given organization, industry or project, measured by the price paid to the producer. This is the broadest measure of economic activity.
- **Gross Domestic Product (“GDP”)**, or value added, refers to the additional value of a good or service over the cost of inputs used to produce it from the previous stage of production. Thus, GDP is equivalent to the unduplicated value of goods and services produced.
- **Employment** is the number of additional jobs created. Employment is measured in terms of full-time equivalents (“FTEs”). One FTE equates to one person-year of employment. That is, one FTE is the equivalent of one person working full-time for a period of a year.
- **Government Tax Revenues** are the total amount of tax revenues generated for different levels of government. Please note that because tax revenues can regularly change due to modifications in tax policy, the tax revenue impacts in this report are estimates only and subject to change. They should be viewed as approximate in nature.

Economic impacts may be estimated at the direct, indirect and induced levels.

- **Direct** impacts are changes that occur in “front-end” businesses that would initially receive expenditures and operating revenue as a direct consequence of the operations and activities of a facility.
- **Indirect** impacts arise from changes in activity for suppliers of the “front-end” businesses.
- **Induced** impacts arise from shifts in spending on goods and services as a consequence of changes to the payroll of the directly and indirectly affected businesses.

MNP estimated the economic impacts of the aggregate industry in Alberta using an input-output methodology and economic multipliers that have been endorsed by Statistics Canada. Input-output modelling is a widely-used and accepted approach, making it recognizable by many different stakeholders and audiences. The structure of the approach also facilitates easy comparisons between reported results for different industries and projects.

For a detailed description of MNP’s economic impact methodology, please refer to Appendix B.

ECONOMIC IMPACTS OF THE AGGREGATE INDUSTRY IN ALBERTA

The aggregate industry in Alberta produces impacts at the direct, indirect and induced level. Direct impacts arise from the industry's core activities (i.e., the extraction of sand and gravel from the ground), while indirect and induced impacts arise from linkages that exist with suppliers and other industries. These related and ancillary industries include the transportation of aggregate, equipment suppliers, technology developers and service providers, and machinery and vehicle maintenance.

The aggregate industry was estimated to have generated the following economic impacts in Alberta in 2015:

- Approximately \$1.5 billion in total output, including direct output of \$932 million, and indirect and induced output of \$590 million.
- Approximately \$806 million in total GDP, including direct GDP of \$480 million, and indirect and induced GDP of \$326 million.
- Approximately 4,120 in total full-time equivalent (FTE) positions, including direct employment of 2,098 FTEs, and indirect and induced employment of 2,022 FTEs.
- Approximately \$178 million in total federal, provincial, and municipal tax revenues, including direct tax revenues of \$105 million, and indirect and induced tax revenues of \$73 million to all levels of government.²⁸

Table 3 presents the estimated economic impacts generated by the aggregate industry in Alberta in 2015.

Table 3: Estimated Economic Impacts of the Aggregate Industry in Alberta, 2015

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²⁹ MNP used the employment reported by Natural Resources Canada's Census of Mines, Quarries and Sand Pits in 2015 for NAICS code 21232 to report on the number of direct jobs in the aggregate industry in Alberta, while the indirect and induced number of jobs in the aggregate industry in Alberta were derived using Statistics Canada's 2013 multipliers. Direct, indirect and induced jobs generated by the aggregate industry in Alberta were converted to FTEs using Statistics Canada's CANSIM 383-0033.

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³⁰ Canadian Home Builders Association, "Alberta 2016 Economic Impacts of New Home Construction." Available here: http://www.chba.ca/CHBA/Housing_in_Canada/Information_and_Statistics/impacts/1%20Alberta%20Economic%20Impacts%20of%20New%20Home%20Construction%202016.pdf

³¹ Alberta Agriculture and Forestry. "Forestry Economic Impact Report 2012". May 2013. Available here: <https://www.albertacanada.com/AlbertaForestSector-2012EconomicImpact.pdf>

³² University of Saskatchewan. "Economic Impacts of Livestock Production in Canada – A Regional Multiplier Analysis". September 2012. Available here: <http://www.cattle.ca/assets/Uploads/IA/1228-Final-Report-Multipliers-CCA-Oct-2012.pdf>

5. APPENDICES

APPENDIX A – DATA SOURCES

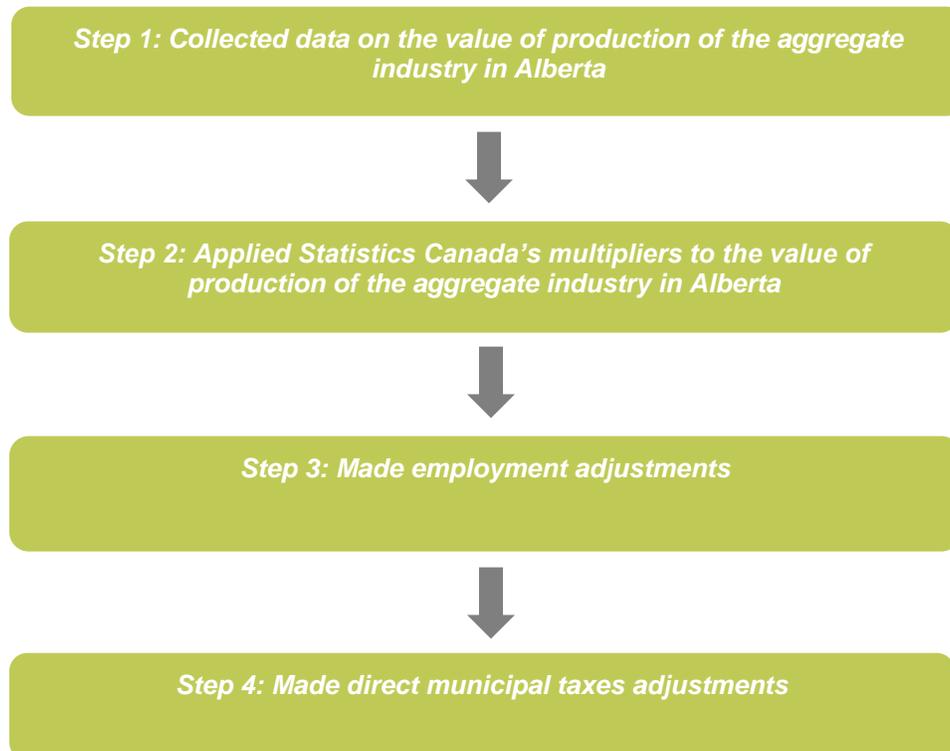
Information used in the study was gathered from the following sources:

- Alberta Agriculture and Forestry. “Forestry Economic Impact Report 2012”. May 2013. Available here: <https://www.albertacanada.com/AlbertaForestSector-2012EconomicImpact.pdf>
- Alberta Sand and Gravel Association. “About”. Available here: <http://www.asga.ab.ca/about.asp>
- Alberta Sand and Gravel Association. “Aggregate 101.” Available here: <http://www.asga.ab.ca/resources-101.asp>
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- Natural Resources Canada. “Available Data on Consumption of Sand and Gravel, by Province, 2015”. Available here: <http://sead.nrcan.gc.ca/MIS/MISTable.aspx?FileT=34&Lang=en&Year=2015>
- Natural Resources Canada. “Principal Statistics, Metal Ore and Nonmetallic Mineral Mining and Quarrying, by Industry and Province, 2013 to 2015”. Available here: <http://sead.nrcan.gc.ca/MIS/MISTable.aspx?FileT=06&Lang=en&Year=2015>
- Ontario Stone, Sand and Gravel Association. “Publications”. Available here: <https://www.ossga.com/publications/>
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- University of Saskatchewan. “Economic Impacts of Livestock Production in Canada – A Regional Multiplier Analysis”. September 2012. Available here: <http://www.cattle.ca/assets/Uploads/IA/1228-Final-Report-Multipliers-CCA-Oct-2012.pdf>

APPENDIX B – ECONOMIC IMPACT METHODOLOGY AND ASSUMPTIONS

MNP's estimates of the economic impacts of the Alberta aggregate industry have been developed using Statistics Canada input-output model and related economic multipliers. A detailed, step-by-step overview of MNP's approach is provided below:

Figure 2: MNP's Approach to Estimating the Economic Impacts of the Aggregate Industry in Alberta



Step 1: Collected data on the value of production of the aggregate industry in Alberta

The first step to estimate the economic impacts of the aggregate industry in Alberta was to collect data on the total value of production of aggregates in Alberta from Natural Resources Canada. MNP used the value of production for North American Industry Classification system code (NAICS) 21232 - Sand, Gravel, Clay and Ceramic and Refractory Minerals Mining and Quarrying. The value of aggregate production in Alberta was estimated at \$934 million in 2015.³³

Step 2: Applied Statistics Canada's multipliers to the value of production of the aggregate industry in Alberta

The economic impacts of the aggregate industry in Alberta were estimated using an economic impact model developed with Statistics Canada's 2013 multipliers. MNP mapped the value of production of the aggregate industry to appropriate provincial multipliers published by Statistics Canada. The model produced estimates of direct, indirect and induced economic impacts, including output, GDP, employment, and government revenues.

Step 3: Made employment adjustments

MNP used the employment reported by Natural Resources Canada's Census of Mines, Quarries and Sand Pits in 2015 for NAICS code 21232 to report on the number of direct jobs in the aggregate industry in Alberta, while the indirect and induced number of jobs in the aggregate industry in Alberta were derived using Statistics Canada's 2013 multipliers.

To convert number of jobs to FTEs, the average annual hours worked by job was obtained from Statistics Canada's CANSIM Table 383-0033, which includes labour productivity and related measures. The number of hours worked per job was divided by 1,950 hours (estimate of number of hours worked by a full-time employee in a year) to estimate the ratio between FTEs and jobs. The average ratio for all industries was then applied to the number of jobs to provide an estimate of the number of FTEs at the direct, indirect and induced level.

Step 4: Made direct municipal taxes adjustments

According to the ASGA, \$8.3 million in CAP levies was collected by Alberta municipalities from sand and gravel operators in 2015. This estimate was added to the direct municipal taxes derived from the economic model for the aggregate industry in Alberta.

³³ Natural Resources Canada. Census of Mines, Quarries and Sand Pits, 2015 for NAICS 21232. "Principal Statistics, Metal Ore and Nonmetallic Mineral Mining and Quarrying, by Industry and Province, 2013-2015".

APPENDIX C – ABOUT MNP

MNP is the fastest growing chartered accountancy and business advisory firm in Canada. Founded in 1945, MNP has grown from a single office in Manitoba to more than 60 offices and 4,000 team members across Canada. MNP is a member of Praxity AISBL, a global alliance of independent firms, which enables us to access a broad range of sector specific expertise worldwide.

At MNP, our professionals are the driving force behind our success. They continue to demonstrate our culture and values which is integral to the way we conduct business, both internally and externally. As such, MNP is proud to be recognized as one of the *50 Best Employers in Canada* by *Maclean's* magazine.



About MNP's Economics and Research Practice

Economic and industry studies are carried out by MNP's Economics and Research practice. Based in Vancouver, the Economics and Research practice consists of a team of professionals that has a successful track record of assisting clients with a wide variety of financial and economic impact studies. Our work has encompassed a wide range of programs, industries, company operations and policy initiatives, and has helped clients with decision-making, communication of economic and financial contributions, documentation of the value of initiatives and activities, and development of public policy.