

A close-up photograph of a person's hand holding a clump of dark, rich soil with some roots visible. The background is a blurred green, suggesting foliage. This image serves as the background for the lower two-thirds of the cover.

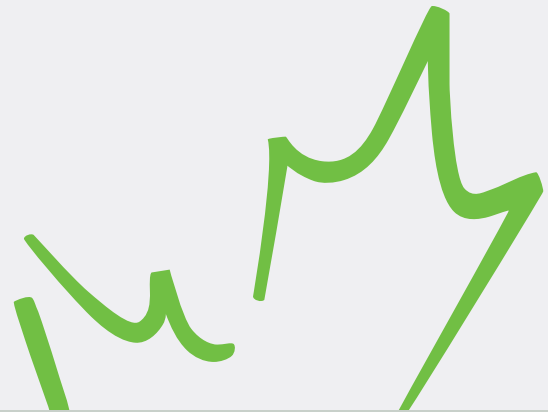
SECTOR SNAPSHOT:

Environmental Assessments and the Workforce in Canada

November 2018

Canada

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About ECO Canada

ECO Canada develops programs that help individuals build meaningful environmental careers, provide employers with resources to find and keep the best environmental practitioners and inform educators and governments of employment trends to ensure the ongoing prosperity of Canada's growing environmental sector.

Labour Market Intelligence

ECO Canada investigates current environmental skills and labour trends within the environmental employment sector and provides up-to-date, timely and relevant insights that can be applied in policy, business, and educational contexts. The complete collection of reports is available at eco.ca.

ECO Canada measures environmental labour market in many ways, such as:

- Job posting analysis or real-time LMI to identify hiring trends and skills in demand
- Exploring demand and supply using secondary statistics, such as Statistics Canada and the Canadian Occupational Projection System, with economic assumptions also factored in to create a labour market forecast for the environmental sector
- Sub-sector profiling with in-depth research on trends and issues driving growth or decline

ECO Canada welcomes comments and discussion of all its LMI reports.

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Executive Summary

The context in which environmental assessments (EA) are conducted and regulated in Canada is becoming increasingly complex and influenced by business, political, social and technological trends. Adding to this complexity is the multi-year, multi-stakeholder, multi-disciplinary framework of EAs, essentially engaging and drawing its workforce from organizations and individuals within primary industries, environmental consulting and engineering service companies, governments and responsible authorities, the public and others.

The purpose of this report is to provide greater clarity on EA roles and required skill sets in the Canadian workforce. It provides an overview of federal EA legislation and regulatory trends in Canada, the current EA sector workforce, and readily available economic measures in terms of projects, employment and revenue. It marks the first step in a process that ECO Canada intends to implement in supporting a sustainable, productive and trusted EA workforce.

Roles, Occupations and Skill Sets

Delivering an EA is a multi-disciplinary team process that demands expertise across scientific, technical, socio-economic, and communication backgrounds. The largest portion of the EA workforce comes primarily from the broad occupational categories of “management occupations” and “natural and applied sciences and related occupations” such as foresters, geologists, biologists, and environmental scientists. EA managers/leads are also part of this unit and are in fact, the hub of the EA process. They oversee the integration of interests of the parties, of the technical and scientific data and of the EA requirements. These leads often started their careers as subject matter experts in areas related to EA and have then developed additional, transferable skills (e.g., strong project management, communication, leadership, critical thinking, etc.) and industry and project-specific knowledge through on-the-job training and work experience. Workers from the broad occupational category of “education, law, and social, community and government services” such as archaeologists and social scientists are also engaged for certain aspects of the EA process.

Four major stakeholder groups are directly involved and/or impacted by the EA process: project proponents, consultants, regulatory bodies and interested stakeholders. It is assumed that a larger portion of the EA workforce exist within the consulting role.

Economic Measures

In 2016, environmental consulting service firms generated close to \$840 million in revenues for EA-specific services. ECO Canada estimates that \$260 million in EA-related salaries and wages were distributed by these companies among 4,000 full-time equivalent employees. These economic measures do not include direct EA activity and practitioners within project proponents, governments and regulatory bodies, engineering service firms and other stakeholders.

Metal ore mining projects make up the highest number of the 194 projects currently listed on the Canadian Environmental Assessment Agency’s EA Registry, followed by:

- Electric power generation and transmission,
- Road transportation,
- Coal mining,
- Oil and gas extraction,
- Water transportation,
- Marine port projects,
- Waste treatment facilities,
- Oil and gas pipeline projects; and
- Liquid natural gas (LNG) plant/terminal and storage facility development.

The greatest number of EAs on provincial registries are related to waste management projects.

EA Trends: Past and Future

Historically, Canada's EA process and legislation have focused on assessing and mitigating adverse environmental impacts resulting from project development. Pending revisions to federal EA legislation, through Bill C-69, are now under review. The proposed legislation will mandate the evaluation of socio-economic, cultural, gender, human rights, sustainability, and climate change impacts and related considerations, in conjunction with the traditional biophysical impacts.

Despite the proposed changes, industry interpretation of the existing legislation and standard practice have long included incorporating traditional knowledge as well as socio-economic and cultural considerations as part of the EA scope. Consequently, project proponents and EA practitioners indicate that legislation is "simply catching up with industry leading practices".

Conclusion

Despite forthcoming changes, input from various stakeholders has confirmed that the need for traditional skill sets across the key phases of the EA process will remain. However, demand for knowledge and experience from anthropologists, archaeologists, historians, social scientists and other related occupations are expected to increase for certain aspects of the evolving EA process.

Input from stakeholder consultations suggests that the new legislation will continue to require skill sets across project screening and planning, data collection and analysis, and impact mitigation and monitoring, along with the need for EA practitioners to have expertise in:

-
- » **Sustainability and climate change assessment**
 - » **Cumulative effects as well as strategic and/or regional assessments**
 - » **Advanced data management (e.g., big data) and modelling**
 - » **Stakeholder communications and engagement, including facilitation and mediation skills**
 - » **Translation and integration of traditional knowledge and impacts on Indigenous land, resource use, and culture**
-

It is evident there will be a continuing and strong need for inter-organizational collaboration to communicate EA-relevant processes, knowledge and expertise. The more that universities, research institutes, governments, industry, EA practitioners, Indigenous groups and other stakeholders can learn about and from each other, the more that EA skill sets can be developed and the more that EAs can become efficient and effective within the community at large.

As indicated, ECO Canada intends to play a role in supporting a sustainable, productive and trusted EA workforce. This report is a first step in providing greater clarity on EA roles and required skill sets in the Canadian workforce. In addition, ECO Canada has assembled a taskforce of EA experts and relevant stakeholders to create an EA lead/manager competency profile as a new addition to ECO Canada's [National Occupational Standards \(NOS\)](#).



1 Introduction

Environmental assessments (EA) have had a long history in Canada and are shaped by market, regulatory, social and technological forces. Pending revisions to federal EA legislation under review in Canada has increased public attention and interest in the EA sector. In response to these shifts, ECO Canada conducted research to profile the current federal EA landscape in Canada, including consideration of how proposed changes may impact the EA sector and its workforce. Research for this study included undertaking a broad sweep of more than 30 relevant reports and articles, as well as a review of EA trends in Canada and across the globe. Sector profiling work included statistical data collection and analysis to provide an overview of the EA structure and composition. Stakeholder consultation was also undertaken through 12 key informant interviews with leaders from government, non-governmental organizations, the private sector (from both major industries and service firms) and education and training institutes.

This report is a snapshot of the current situation written with the full knowledge that changes are on the way. Recognizing this, the report opens with an overview of the federal EA process and trends, changes likely to come as a result of Bill C-69, and closes with a high-level profile of the current EA sector and its workforce in Canada, including talent needs and available economic measures.

The information contained within this report should help audiences broaden and deepen their understanding of the EA sector and its workforce in Canada. Individuals and organizations may also begin to understand how to best adapt or develop competencies, education and training programs to respond to EA skill requirements today and in the future.



THIS REPORT INCLUDES:

- An overview of the federal framework and trends impacting the EA sector in Canada.
- A profile of the current EA structure and workforce in Canada, including occupations and most relevant skill sets required.
- A measure of EA economic activity and workforce size based on available statistics.
- Insights on how the proposed legislation might impact the EA sector and its workforce.



2 Federal Environmental Assessments in Canada

According to the Government of Canada's Canadian Environmental Assessment Agency website, environmental assessment (EA) is defined as *"a process to predict environmental effects of proposed initiatives before they are carried out. It is one which:*

- *Identifies potential adverse environmental effects*
- *Proposes measures to mitigate adverse environmental effects*
- *Predicts whether there will be significant adverse environmental effects, after mitigation measures are implemented*
- *Includes a follow-up program to verify the accuracy of the environmental assessment and the effectiveness of the mitigation measures"*¹

In Canada, the terms environmental assessment (EA) and environmental impact assessment (EIA) are often used interchangeably.

¹ See: [Definition of Environmental Assessment, Government of Canada, as of August 2018.](#)

A Good EA is:

- Strategic
- Rational
- Expansive
- Inter-disciplinary
- Communicative
- Consultative
- Integrative
- Defensible

In Canada, EAs are typically used by various levels of government, who apply EA in a regulatory approval process scoped around the complexity of a proposed project. Larger, more complex projects often require joint or multiple environmental assessments. To minimize overlap and the duplication of efforts, the current federal legislation² includes provisions for cooperation and coordinated action between the federal and provincial/territorial governments.³

In some cases, governments and private companies will voluntarily conduct internal EAs as project ‘pre-feasibility’ studies, or more specifically, to evaluate their general compliance with environmental laws and regulations or anticipating the likely impacts and benefits of a planned project, program or policy⁴ as part of developing a business case for proceeding. Regardless of the rationale for undertaking EAs, the occupations and skill sets required to conduct a full-scale EA are relatively the same.

The Federal Environmental Assessment Legislation and Process in Canada

Understanding EA legislation and processes is essential to understanding the EA sector and how it is structured. This section focuses on the federal EA process because:

- The federal framework covers comprehensive and complex aspects of EAs in Canada
- EA legislation and processes can vary widely from province to province

The Canadian Environmental Assessment Act, 2012 (CEAA 2012)⁵ and its regulations currently establish the principle legislative basis for the federal requirements of environmental assessment in Canada. A federal EA may be required because of the potential adverse environmental effects on areas of federal jurisdiction or that may result from a federal decision about the project. CEAA 2012 applies to projects described in the *Regulations Designating Physical Activities*⁶ or designated by the Minister of the Environment.⁷

Under the CEAA 2012, the federal EA process can be managed by a responsible authority or by a review panel. Responsible authorities currently include the Canadian Environmental Assessment Agency, National Energy Board (NEB), and the Canadian Nuclear Safety Commission (CNSC).⁸

² See: [Canadian Environmental Assessment Act, 2012, Current to July 2018](#).

³ In reality, most provinces do not have federal-provincial EA harmonization agreements in place and projects can sometimes require both provincial and federal EA approvals.

⁴ The environmental assessment of policy, plan and program proposals is often referred to as strategic environmental assessment (SEA) (See: [The Cabinet Directive on the Environmental Assessment of Policy, Plan and Program proposals](#) as of March 2017)

⁵ See: [Canadian Environmental Assessment Act, 2012, Current to July 2018](#).

⁶ See: [CEAA 2012, Regulations Designating Physical Activities, Government of Canada, Current to July 2018](#).

⁷ See: [Designating a Project under the Canadian Environmental Assessment Act, 2012, March 2015](#).

⁸ In addition to CEAA, the NEB may be a responsible authority under the *National Energy Board Act* (NEB Act) or the *Canada Oil and Gas Operations Act* (COGOA), and the CNSC may be a responsible authority under the *Nuclear Safety and Control Act* (NSCA).

THE FOLLOWING MUST BE CURRENTLY CONSIDERED AS PART OF A FEDERAL EA:

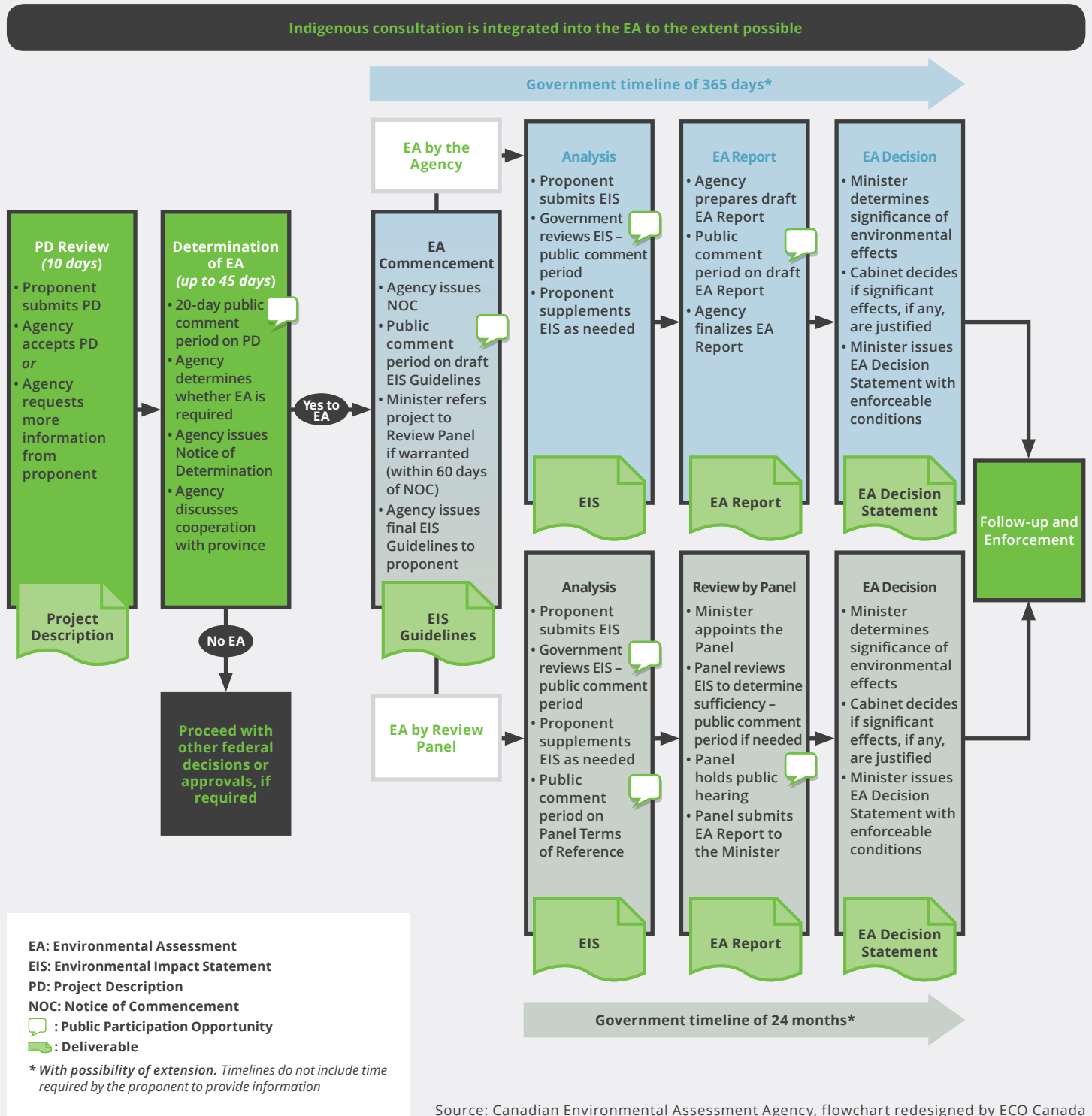
- Environmental effects, including those caused by accidents and malfunctions, as well as cumulative environmental effects
- Significance of those environmental effects
- Public comments
- Mitigation measures and follow-up program requirements
- Purpose of the designated project
- Alternative means of carrying out the designated project
- Changes to the project caused by the environment
- Results of any relevant regional studies

Historically, the federal EA process and legislation have focused on assessing and mitigating adverse environmental impacts resulting from project development. In reality, industry interpretation of legislation and standard practice have long included socio-economic and cultural considerations, such as traditional knowledge, as part of the EA scope.

Figure 1 outlines the existing federal EA process. The current federal legislation sets government-task timelines in EA but does not set timelines for non-government activities such as those undertaken by the proponent. Therefore, the lapsed time for an EA process can vary significantly due to a host of factors including level of stakeholder concerns and who prepares the EA Report. For example, an examination of the Canadian EA Registry for mining projects shows that assessments of five projects have been completed within 2.2 to 3.1 years after a project description had been posted on the Registry.⁹ Large complex EAs, such as major pipeline transmission projects, can extend for several years and require a commitment to multi-year monitoring and follow-up activities extending beyond the construction period.

⁹ See: [Canadian Environmental Assessment Registry, CEAA](#) Based on completed EAs on mining projects prior to October 2016.

Figure 1: The current EA process as managed by the CEAA¹⁰



10 See: [Environmental Assessment Process as Managed by the CEAA](#)

Market and Regulatory Trends Shaping Federal Environmental Assessments in Canada

The process of conducting EAs was introduced by the United States in the 1970s, driven largely by growing social awareness of environmental issues around industrial and resource development. EA legislation in the US was developed with the intent for EA to take place in the early project planning phase and sought to identify and address potential adverse effects and mitigation strategies, as well as questions around alternatives. As more countries adopted EA legislation and their experience grew around the process, interpretation around the purpose of an EA evolved as well. As a result, the scope and process began to vary by country and agency; however, for many countries, the implementation of EA focused on identification and mitigation of biophysical impacts.

Today, international EA practices are undergoing a shift to adapt to the demand for a more holistic approach. Leading practices incorporate measures to assess and mitigate impacts beyond the biophysical environment, to enhance local and regional project benefits, and to include assessments of effects on the rights and interests of Indigenous peoples. There is also a strong desire for greater efficiencies across all stages of the EA process, through centralizing the review and approval process to one government body, the development of guidance documents that provide stakeholders with clarity around the process, and reducing the mandatory timelines and increasing transparency for decision and approvals from government.¹¹

The evolution of Canada's federal EA framework was driven largely by the growing social awareness around environmental impacts from large scale project developments. In the 1970s, federal hearings processes considered EAs and stipulated environmental and socio-economic conditions on approvals. This continued through the 1980s with the Federal Environmental Assessment Review Office and the Environmental Assessment and Review Process which later evolved into the Environmental Assessment and Review Process Guidelines Order. In the 1990s, the federal government's *Canadian Environmental Protection Act* and *Canadian Environmental Assessment Act (CEAA)* brought environmental considerations and public participation into the decision-making process.

While the current federal EA legislation in Canada is similar to other jurisdictions, it does not mandate some of the leading practices occurring within Canada and some areas of the globe. These may include assessing strategic/regional impacts and conducting meaningful public and Indigenous consultation in all phases of the EA. It is noteworthy that some aspects of new federal EA legislation being proposed are already being addressed in current EA processes. For example, some project proponents in Canada engage communities before they formally trigger the regulatory approvals process to gain local knowledge and insights to improve planning, to ensure the project could accommodate the needs of the community and governments who have regulatory approvals authority or have responsibility for services and programs necessary to mitigate negative impacts or enhance benefits.

¹¹ See: [Recent Developments with National and International Environmental Impact Assessment Processes](#)

Federal policymakers have moved to incorporate these trends and practices into legislation through Bill C-69.¹² The bill is seeking to mandate the study of impacts that align with the Federal Government's commitments to national and international greenhouse gas (GHG) emission reduction targets and subsequent policies around sustainability, climate change, and adapting infrastructure, energy, and resource development projects to these realities.¹³

The proposed *Impact Assessment Act* (IAA), part of Bill C-69, looks to make changes to the existing federal EA process, renaming it "Impact Assessment" or IA. Bill C-69 seeks to enact the IAA and the *Canadian Energy Regulator Act*, and to amend the *Navigation Protection Act*.

The proposed changes through Bill C-69 and the IAA seek to broaden EA into a more holistic and systemic approach designed to assess both positive and adverse effects of a designated project.¹⁴ Compared to the current EA process, the revised process puts greater emphasis on public participation and transparency, cooperation across jurisdictions (including the single IA Agency), and engagement with Indigenous peoples that will begin in the early planning phases and continue through the entire IA process.

Some provincial EA processes could also see some changes

Changes or reviews to provincial EA requirements or processes may also surface in the short term. British Columbia, for example, is reviewing its environmental assessment processes with a discussion paper released as recently as June 2018.

See: [Environmental Assessment Revitalization Discussion Paper](#), British Columbia, June 2018.

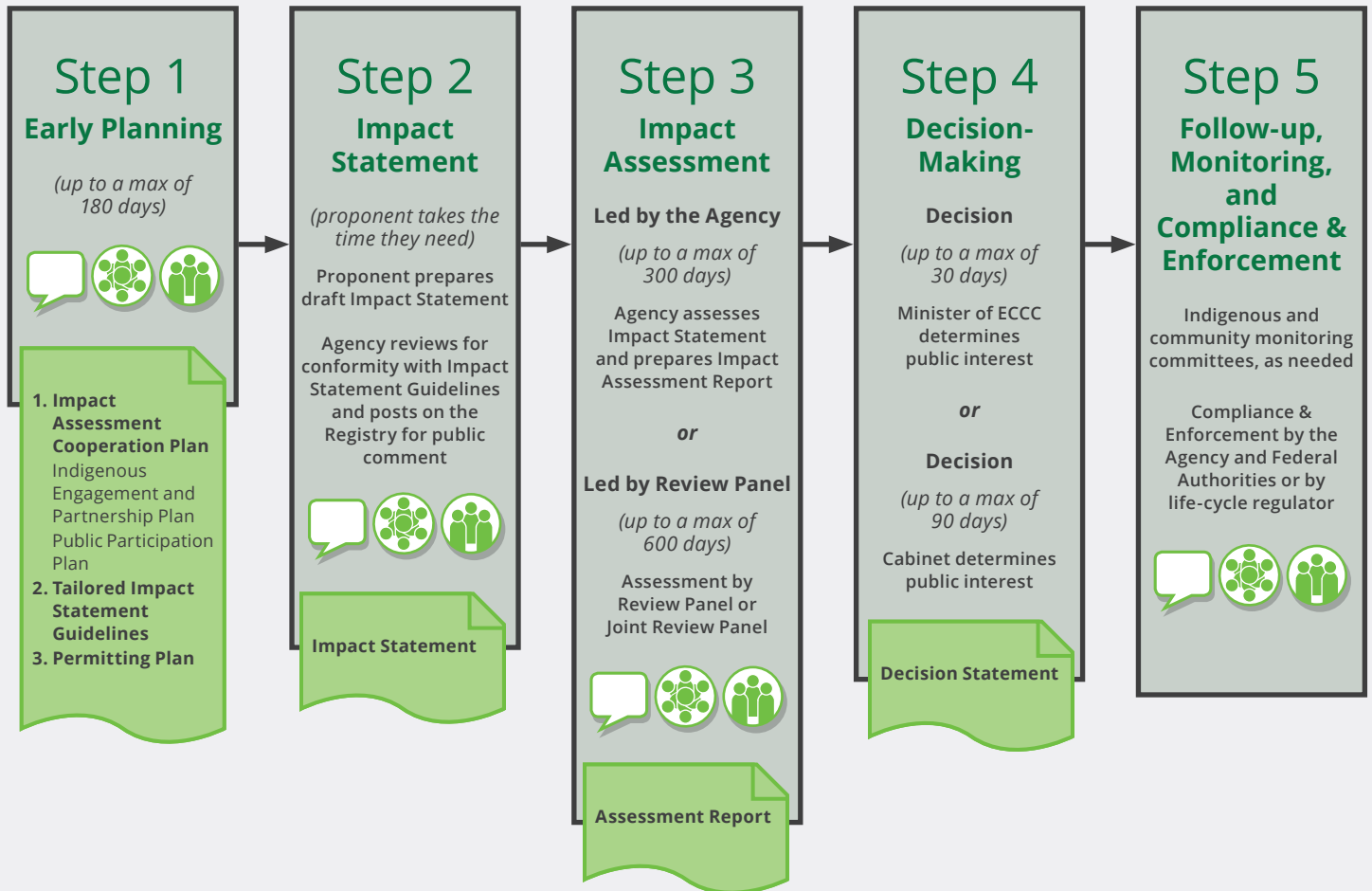
The proposed legislation would also mandate the evaluation of socio-economic, cultural, gender, human rights, sustainability, and climate change impacts and related considerations, in conjunction with the traditional biophysical impacts. The new measures will also implement an updated Project List. While the details of the Project List have yet to be finalized, sustainability assessment criteria will be applied and could impact the types of projects that will need to undergo a federal IA and receive approval.¹⁵

¹² See: [Bill C-69 \(Third Reading\)](#), Governor General of Canada, June 2018.

¹³ See: [Federal Environmental Assessment Reform Summit Proceedings](#), August 2016.

¹⁴ Ibid.

¹⁵ See: [Where Climate Change and Impact Assessment Meet, Politics Rules Supreme](#), Jeff Carruthers, April 2018. and [Canadian Energy Industry Slams Liberals' Environmental Assessment Rules](#), Shawn McCarthy, April 2018.

Figure 2: The IA process under the proposed Impact Assessment Act¹⁶

- : Deliverable
- : Public Participation and Transparency
- : Cooperation with Jurisdictions
- : Engagement with Indigenous Peoples

Source: Government of Canada, redesigned by ECO Canada

¹⁶ See: [Better Rules for Major Project Reviews: A Handbook](#), Government of Canada.

The revised process also seeks to establish a single agency, the Impact Assessment Agency, to oversee federal IAs, to streamline timelines and to provide a framework for considering sustainability criteria and the cumulative effects of climate change and other environmental factors. *Figure 2* depicts a simplified view of how the proposed new system will flow from early planning to follow-up and monitoring.

For environmental groups and several Indigenous communities, the new process is viewed as a step in the right direction although still not thorough enough. However, major industries such as energy and mining and EA-related service firms alike are skeptical of the new assessment process and wary that it may lead to longer timelines, higher EA costs and potentially discourage new industry investments. In reality, and despite the proposed regulatory changes, EA practitioners in Canada argue that legislation is simply catching up with industry leading practices.





3 Canada's Environmental Assessment Sector and Workforce

Key Roles in the Environmental Assessment Process

EA is a multi-stakeholder process involving organizations and individuals within primary industries, environmental consulting and engineering service companies, governments and responsible authorities, the public and others.

There are four major roles directly involved and/or impacted by the EA process. These groups employ and/or engage a portion of the EA workforce. The groups are as follows:

- Project proponents
- Consultants
- Interested stakeholders
- Regulatory bodies



Project Proponents

Project proponents are the project owners or sponsors. Although they are commonly associated with private companies from key industries such as mining and energy, many major projects that require an EA could be owned by governments or crown corporations.

Depending on the size of a firm and its structure, as well as the nature or size of the approval or authorization required, project proponents may work on elements of the EA approvals process internally, or they may bring on third-party engineering firms and/or environmental consultants to assist in managing the process or specific elements of it that require more technical expertise.

Consultants

In the context of environmental assessments, consultants are typically environmental and engineering consulting firms who are engaged by project proponents, regulatory bodies and sometimes, interested stakeholders. Occasionally, subject matter experts (SMEs) such as biologists that study potential soil contamination may come from academic, research and other types of institutions and are sub-contracted.

Consultants contribute to the EA process by EA design and management, regulatory liaison, data generation and analysis as well as planning to mitigate present and potential impacts of projects. They could be subject matter experts within different fields (e.g., life sciences, social science, engineers, economists, etc.) or EA specialists who oversee the environmental assessment and integrates technical and scientific data from the SMEs.

Regulatory Bodies

Regulatory bodies are responsible authorities accountable for ensuring that EAs provide relevant and adequate information for decisions regarding the project. They are tasked with project approvals/decision, setting conditions and ensuring compliance.

Interested Stakeholders

This group includes individuals or groups who are potentially impacted from a project and/or represent a local or national group with relevant concerns. The group may include residential communities, Indigenous peoples, government and non-government organizations. Their role in the EA process is to ensure that their interests are understood and considered regarding the project. Particularly for panel reviews and public hearings, these groups are typically funded to hire independent consultants or experts to conduct specific EA components, based on their areas of concerns.

Figure 3: Key roles within the EA process



Environmental Assessment Occupations

The **EA workforce** consists of individuals in all four stakeholder groups identified in *Figure 3*. Some, such as EA specialists and governments, will work full time on EA projects; others such as project owners/sponsors, scientists and environmental non-governmental organizations will get involved in the EA process when and as needed.

EA leads/managers are the hub of the EA process. They oversee the integration of interests of the parties, of the technical and scientific data and of the EA requirements. They often have started their careers as SMEs in areas related to EA and have then developed EA skills through work experience.



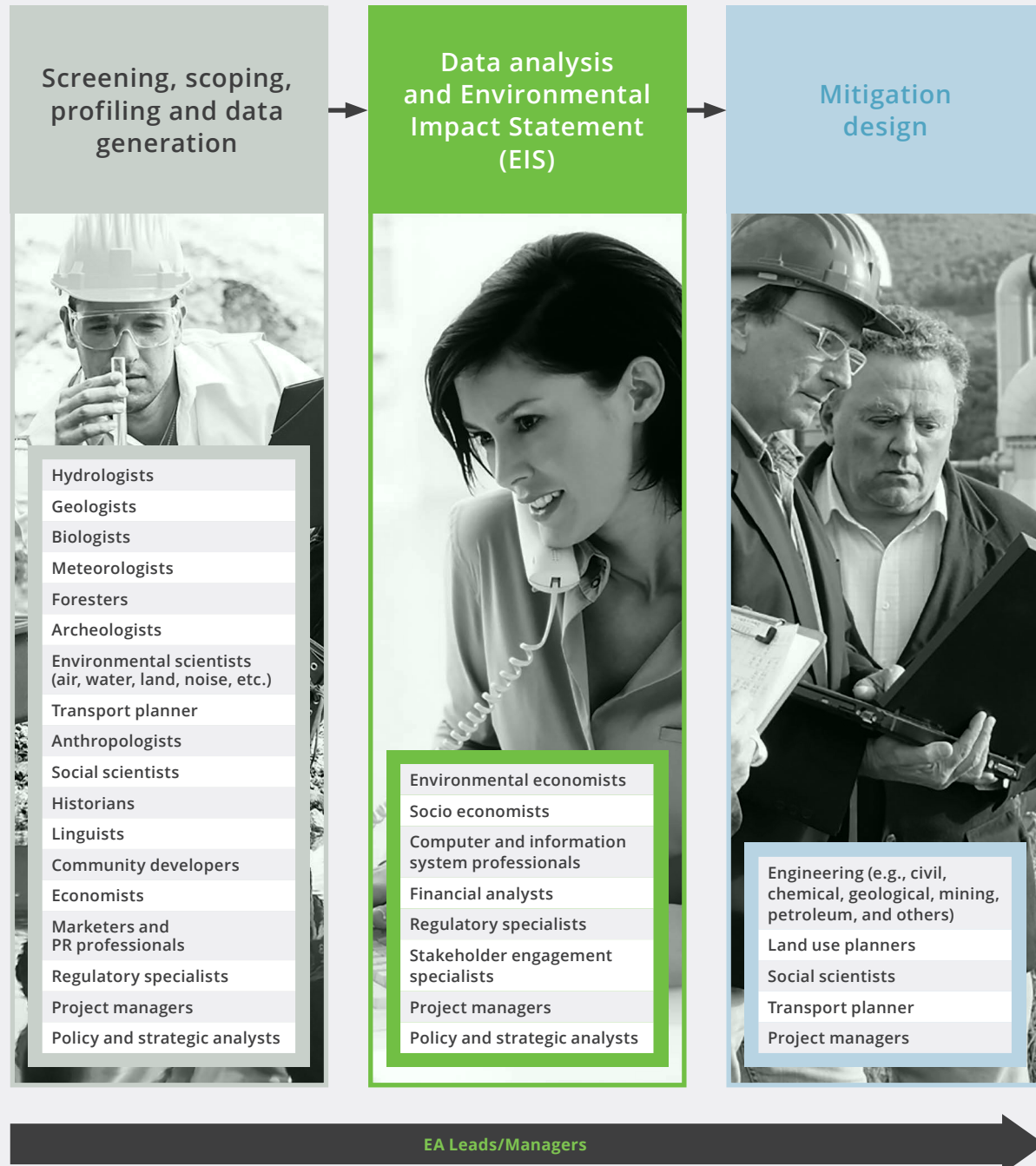
EA leads normally carry at least one of three standard accountabilities within the EA process:

- Conduct the EA
- Communicate with stakeholders
- Assess the adequacy of the EA in achieving its objectives

The remaining workers active in the EA project space come primarily from the broad occupational categories of “management occupations” and “natural and applied sciences and related occupations”.

Increasingly, EAs require consideration of the social, cultural, and community impacts from the proposed development of a project. As a result, workers from the broad occupational category of “education, law, and social, community and government services” are increasingly being engaged for certain aspects of the EA process. These include occupations such as economists and economic policy researchers and analysts, anthropologists, archaeologists, historians, linguists, social scientists and professional occupations in advertising, marketing and public relations.

Figure 4: EA leads/managers and examples of SMEs often taking part in EA work



Source: Delphi Group with modifications from ECO Canada

Environmental Assessment Skill Sets

Delivering an EA is a multi-disciplinary team process that demands expertise across scientific, technical, socio-economic, and communication backgrounds. These skills are usually founded in education at the undergraduate and master's degree levels within occupations.

At the core level of the EA process, key knowledge and skills are rooted in managerial positions. Under the oversight of the EA lead, SME managers are responsible for translating information from key baseline data, impact identification, and mitigation design into coherent and comprehensive plans and reports.

Core activities in the EA process include, at a minimum:

- » **Developing an understanding of the basic project conceptual design, need, purpose and location**
- » **Collection of data to understand the baseline conditions of a project's geographic area, which requires training in science and field work**
- » **Evaluation of the baseline situation (trends and variability), requiring data and analytical skills**
- » **Identification and evaluation of feasible alternatives**
- » **Identification and characterization of potential impacts of proposed physical works and activities for each alternative**
- » **Identification and characterization of mitigation and enhancement measures**
- » **Development of environmental protection, monitoring and follow up plans**
- » **Effective communication throughout these phases, both written and oral¹⁷**

¹⁷ See: [Fundamental Skills of EIA: ESDC Training Series in Ghana, USAID, January 2017](#) with additions from ECO Canada.

EA industry experts consistently point to the importance of **strong project management skills and multi-disciplinary environmental backgrounds** as essential EA lead/manager attributes. EA leads that possess a broad understanding of the environmental, technical, and social components and are able to integrate, understand, and communicate all issues from various backgrounds, are key to delivering successful EA projects.

Clear and effective communication skills are essential to high-quality EA projects and essential for the EA lead. This applies to written communication among proponents and consultants, as well as verbal and written communication during the consultation process with communities, Indigenous groups and regulators. Moreover, technical writing is critical as EA reports must always represent the research and analysis concisely and accurately.



It is also important for an EA lead to have a strong understanding of the industry and the region for which the EA is being prepared. In addition, the EA lead also needs a general understanding of the project elements such as design, cost and schedule, and be able to work with all the teams in an iterative process to reach consensus.

Potential Impacts on Skill Sets and Training Needs from Bill C-69

While the legislative changes from Bill C-69 are broad and will take time to operationalize, the larger assessment scope will intensify the demand for certain skills from Canada's EA sector. EA practitioners, both EA leads and SMEs, will be pushed by new legislation, big data and powerful technologies, to increase knowledge and expertise in the following areas:

- » **Sustainability and climate change assessment**
- » **Cumulative effects assessments across health, society, economy, environment, biodiversity, and sustainability through strategic and regional, holistic assessments¹⁸**
- » **Regional and/or strategic impact assessments**
- » **Translation and integration of traditional Indigenous knowledge and land and resource use studies**
- » **Stakeholder communications and engagement including Indigenous (such as traditional knowledge holders) and other identity groups**
- » **Facilitation and mediation skills**
- » **Data management and analysis**

As the proposed Bill C-69 changes come into effect, universities, colleges and national EA organizations are well positioned to collaborate and assist current professionals and graduates in adapting their skill sets to reflect the global shift that is underway. This includes providing more training and knowledge on public and Indigenous consultation, cumulative and strategic assessments based on sustainability and climate change impacts and translating traditional knowledge to inform EA reporting.

¹⁸ See: [Canada's New Environmental Impact Assessment Scheme](#), JFK Law Corporation and Mae Price, February 2018.





4 Economic Measures of Canada's Environmental Assessment Sector

There is no one source that captures employment and economic data from all Canadian EA projects. This section presents economic estimates based on readily available data.

Environmental Assessment-Specific Revenues, Salaries and Employment

Based on Statistics Canada figures on environmental consulting services (North American Industry Classification System or NAICS 54162), "EA-specific environmental consulting services" generated **close to \$840 million in revenues in 2016**.¹⁹ This economic measure is understated since it does not capture EA work directly undertaken by the project proponent, project reviewers and other stakeholder groups.

ECO Canada estimates that in 2016, EA-specific environmental consulting services paid out \$260 million in salaries, wages, commissions and benefits to close to 4,000 full-time equivalent (FTE) workers.²⁰ This was calculated on the assumption that the proportion of EA-related consulting services to total consulting services revenues also applies to total salaries and wages.

¹⁹ Calculated using statistical data from Statistics Canada Tables 33-10-0162-01 and 21-10-0166-01.

²⁰ The Statistics Canada table used in this analysis and the equivalent tables for Engineering Services do contain other line items related to "environmental" services although not specifically to "EA" services. We have not presented these other line items in this analysis due to inability to determine relevancy to EA. Persons wishing further detail may contact research@eco.ca.

Table 1: Revenues and estimated salaries and employment within Canada's EA-related consulting services industry, 2016

Economic Measure	Size	Notes
Revenues	\$839M	4.2% of \$20B in total consulting service revenues
Estimated Salaries, Wages, Commissions and Benefits	\$260M	4.2% of \$6.2B in total salaries, wages, commissions and benefits for consulting services
Estimated Jobs (in full-time equivalent or FTEs)	3,962 FTEs	\$260M divided by \$65.5K average salary and wages for consulting services

Data Sources: Statistics Canada Tables 33-10-0162-01, 21-10-0166-01 and 14-10-0203-01.

The revenue, wage and workforce numbers in Table 1 are based on figures reported by consulting service firms. EA-specific economic measures from other sectors that employ the EA workforce, such as major industries, governments, engineering service firms, and academic institutions are not readily available. While it is not possible to isolate EA-related employment within these sectors, stakeholders interviewed indicate that employment numbers from other sectors are likely fewer in comparison to the 4,000 estimated FTEs employed within EA-specific environmental consulting services.

Number and Distribution of Environmental Assessment Projects in Canada

A review of the projects listed on federal and provincial government EA registries in Canada²¹ provides insights into the industries (and related skill sets) most subjected to and impacted by the EA process over the last several years.

EA Projects under Federal Review

By industry, and as illustrated in *Figure 5*, metal ore mining projects (NAICS 2122) make up the highest number of the 194 projects currently listed on the Canadian Environmental Assessment Registry.²² Other industries in Canada where major projects have been regularly subject to a federal EA in the last several years include electric power generation and transmission, road transportation, coal mining, oil and gas extraction, water transportation and marine port projects, waste treatment facilities (including for nuclear waste), oil and gas pipeline projects, and liquefied natural gas (LNG) plant/terminal and storage facility development.

²¹ In many cases, jurisdiction on EA is shared between federal and provincial authorities (except for the territories which continue to manage their own EA processes). Federal and provincial authorities have different mandates constitutionally and, as such, no two EA processes in Canadian jurisdictions are identical.

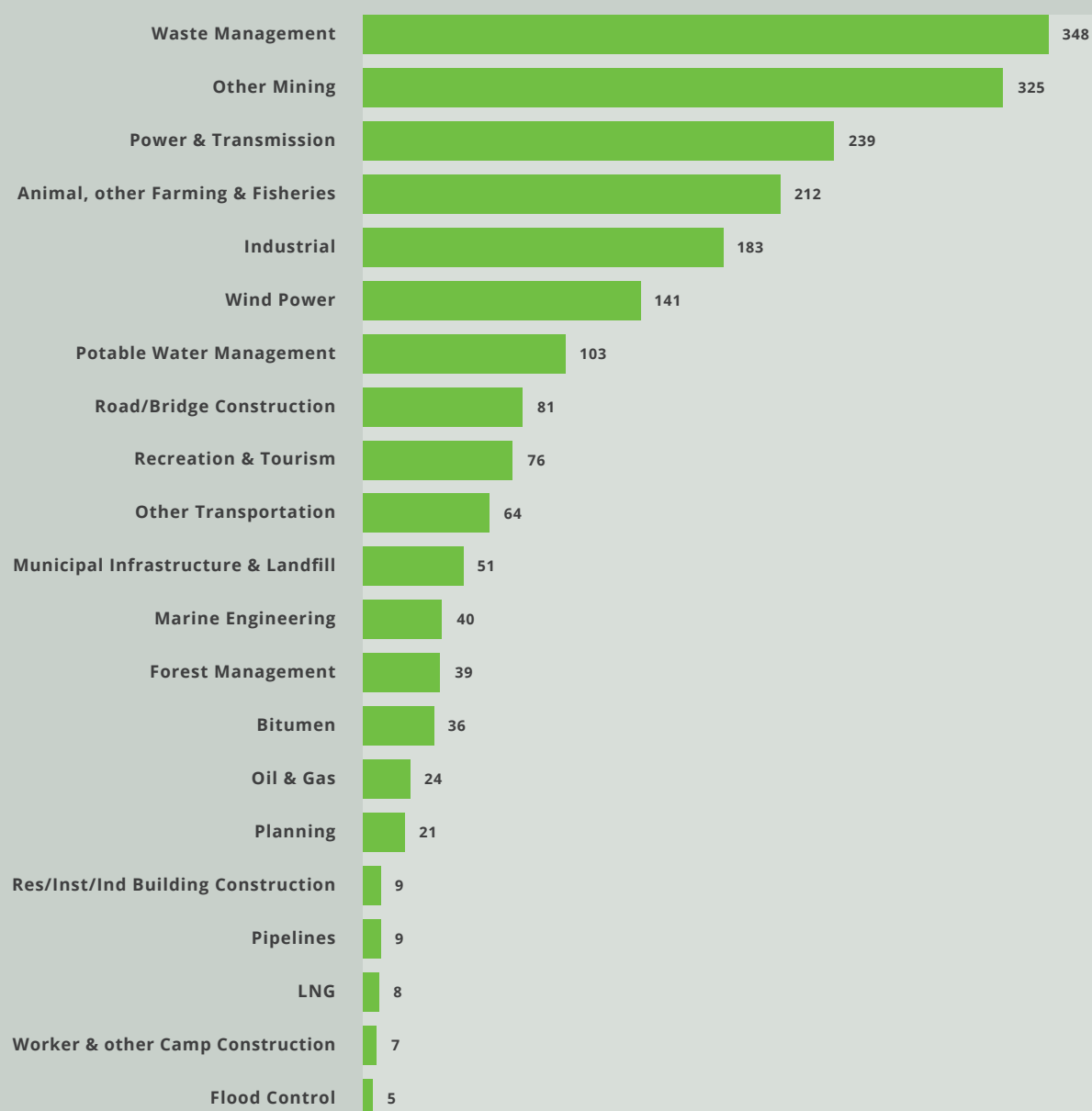
²² See: [Canadian Environmental Assessment Registry, CEAA](#)

Figure 5: The number of projects listed on the Canadian EA Registry, by industry NAICS

Source: Canadian Environmental Assessment Registry, as of April 18, 2018

The waste management sector represents the highest number of projects that have been subjected to provincially-based EA reviews in Canada since 2012, making up 348 of the 2,021 projects (17 percent) listed on provincial registries. Additional project types commonly requiring EAs under provincial jurisdiction since 2012 include power generation and transmission projects, wind power, and road and bridge construction.

Figure 6: The number of projects (excluding offshore oil and gas) listed on provincial EA registries since 2012



Source: Provincial EA Registries, as of April 24, 2018

Table 2: Projects listed on provincial registries by project type, January 2012 to April 2018.

Project Type	BC	AB	SK	MB	ON	QC	NL	NS	NB	PE	Total Provinces (Excluding Offshore Oil & Gas)
Waste Management	14		1	238	17	20	21	3	32	2	348
Other Mining	42	6	27	14	7	93	110	18	8		325
Power & Transmission	17	1	3	16	164	9	8	2	14	5	239
Animal, other Farming & Fisheries			4	100		7	67		12	22	212
Industrial	2		3	114		7	36		9	12	183
Wind Power	9		3	4	74	6		41	3	1	141
Potable Water Management			3	53		4		4	38	1	103
Road/Bridge Construction			3	7	1	41	16	3	7	3	81
Recreation & Tourism	3			10	1	12	48		2		76
Other Transportation	1			29		15	12			7	64
Municipal Infrastructure & Landfill				14	2	2	10	1	21	1	51
Marine Engineering	2				2	10	11	1	14		40
Forest Management			5	2	3	1	28				39
Bitumen		36									36
Oil & Gas	19	2						1	2		24
Planning					11	10					21
Res/Inst/Ind Building Construction						6		1	2		9
Pipelines	7		1					1			9
LNG	6							1	1		8
Worker & other Camp Construction			1						6		7
Flood Control		2		3							5
Total	122	47	54	604	282	243	367	77	171	54	2,021

Source: Provincial EA Registries

Additional data showing the distribution of projects (whether under federal or provincial jurisdiction) by industry and geography are appended.



5 Conclusions

The EA workforce is a relatively small portion of the overall workforce and the number of EA projects is relatively small within the Canadian economy, but its influence is profound. The EAs connected to energy in particular have made the differences in principles and values across jurisdictions, societal groups and communities highly visible.

ECO Canada's mandate is to support and maintain a capable and accessible workforce in environmental work. This is accomplished primarily through training and certification; supporting and maintaining a capable and accessible workforce in EA is important to industries in Canada.

Bill C-69 and other pending legislation and regulation will change aspects of the structure and governance framework for EA in Canada. While the extent of change to EA practise is unknown at this time and still under debate in the EA industry, some directions are clear:

1. There continues to be a strong need for knowledge building, training and skill development in EA relevant areas.
2. There is a strong and urgent need for inter-organizational collaboration to communicate EA-relevant knowledge and expertise.

There continues to be a strong need for knowledge building, training and skill development in EA relevant areas. These include, amongst others:

-
- » **Multi-disciplinary familiarity and bridging different perspectives on a project**
 - » **Multi-stakeholder communications, including building general public awareness**
 - » **Data collection and analysis**
 - » **Engagement and negotiation with affected communities, Indigenous groups (including traditional knowledge holders) and regulators**
 - » **Incorporating traditional environmental and social knowledge**
 - » **Linking project effects to climate change and the cumulative effects of other major projects**
 - » **Regional cumulative impact, ecosystem and strategic assessments**
 - » **Sustainability impacts**
 - » **Gender-based assessment**
-



There is a strong and urgent need for inter-organizational collaboration to communicate EA-relevant knowledge and expertise. The more that universities, colleges, research institutes, industry, EA practitioners and organizations such as ECO Canada can learn about and from each other, the more that EA skill sets are developed and the more that EAs can become productive and trusted.²³

As indicated previously, ECO Canada intends to play a role in supporting and maintaining effective EAs and an effective EA workforce, and this report is the first step in providing greater clarity on EA roles and required skill sets in the Canadian workforce. In addition, starting in Fall 2018, ECO Canada will assemble a taskforce of EA experts and relevant stakeholders with the intent to create an EA Lead/Manager competency profile as a new addition to its National Occupational Standards (NOS).²⁴



²³ See: [Federal Environmental Assessment Reform Summit Proceedings, West Coast Environmental Law, August 2016](#).

²⁴ See: [Competencies for Environmental Professionals in Canada: National Occupational Standards, ECO Canada, August 2016](#) for the current standards.

Appendix: Projects on the Federal & Provincial Environmental Assessment Registries

Projects on the Canadian Environmental Assessment Registry

The figures below provide a summary of all projects currently registered (as of April 2018) on the Canadian Environmental Assessment Registry by project type.

Power & Transmission

	BC	AB	SK	MB	ON	QC	Maritimes	NL	Territories	Total
Hydroelectric	3	1		1	1					6
NG Power Station		4	2		2					8
Transmission Line				1				1		2
Total	3	5	2	2	3	0	0	1	0	16

Marine Engineering

	BC	AB	SK	MB	ON	QC	Maritimes	NL	Territories	Total
Marine Terminal Construction/ Upgrade	3					3		1		7
Marine Construction (transmission line)								1		1
Marine Engineering (contamination cleanup)	1				2	1				4
Marine Engineering (dam structure renovation)		1								1
Total	4	1	0	0	2	4	0	2	0	13

Waste Management

	BC	AB	SK	MB	ON	QC	Maritimes	NL	Territories	Total
Biomedical Waste Incinerator		1								1
Waste Management Facility		1								1
Nuclear Decommissioning				1	1					2
Asbestos Disposal							1			1
Nuclear Waste					2					2
Nuclear Reactor Refurbishment					1					1
Decommissioning Port Hope ON Buildings, Land etc. (environmental)					1					1
Total	0	2	0	1	5	0	1	0	0	9

Liquified Natural Gas (LNG)

	BC	AB	SK	MB	ON	QC	Maritimes	NL	Territories	Total
LNG Plant/Terminal Development	8					1				9
LNG Storage Facility		1								1
Total	8	1	0	0	0	1	0	0	0	10

Transportation

	BC	AB	SK	MB	ON	QC	Maritimes	NL	Territories	Total
4883 - Support activities for water transportation	5					4	1	2		12
4862 - Pipeline transportation of natural gas	5	3				1				9
4861 - Pipeline transportation of crude oil		3			1					4
4821 - Rail transportation		2			1	1				4
4884 - Support activities for road transportation		4	2	2	6	2	1		1	18
4931 - Warehousing and storage		2			1					3
Total	10	14	2	2	9	8	2	2	1	50

Mining

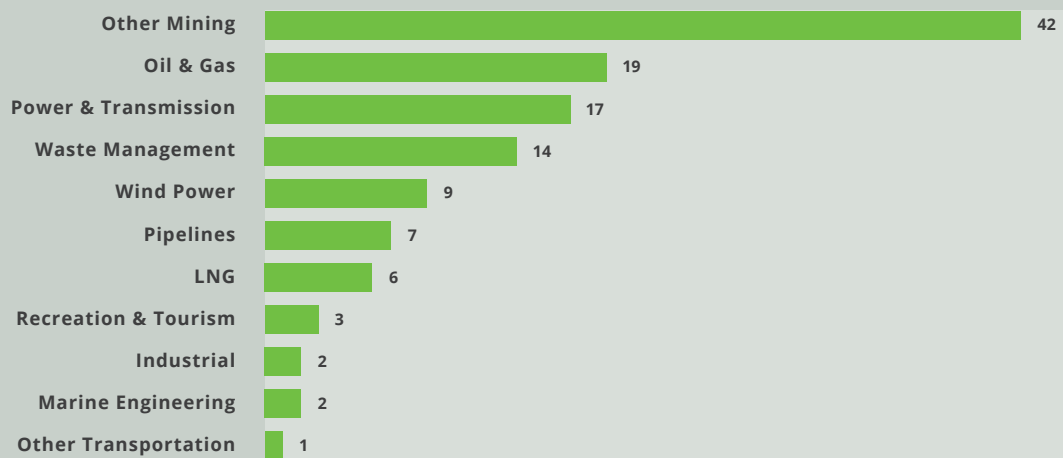
	BC	AB	SK	MB	ON	QC	Maritimes	NL	Territories	Total
Gold/Copper/Silver	12			2	10	2	2	1		29
Coal	10	2					1			13
Niobium/Chromite/Molybdenum	2				1		1			4
Sand/Gravel/Waste Rock	1					1				2
Oil Sand/Bitumen		3								3
Mining (uranium)			3							3
Mining (potash/apatite)			1			1				2
Mining (diamond)			1		1	1				3
Mining (iron)					2	4		4		10
Mining (nickel)						1				1
Mining (lithium)						4				4
Mining (rare earths)						1		1		2
Total	25	5	5	2	14	15	4	6	0	76

Projects on Provincial Environmental Assessment Registries

The figures below provide a summary of projects that were registered on provincial EA registries (by province) between 2012 and April 2018, not including offshore oil and gas projects as well as smaller projects.

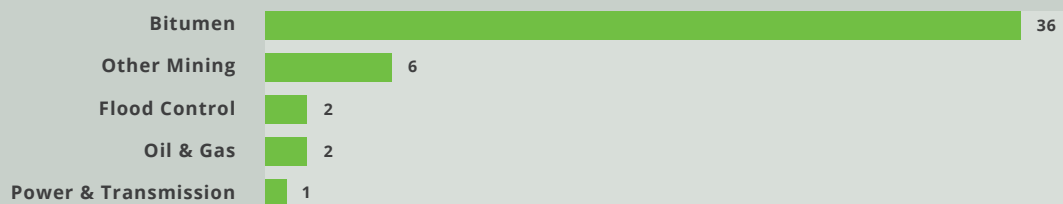
British Columbia

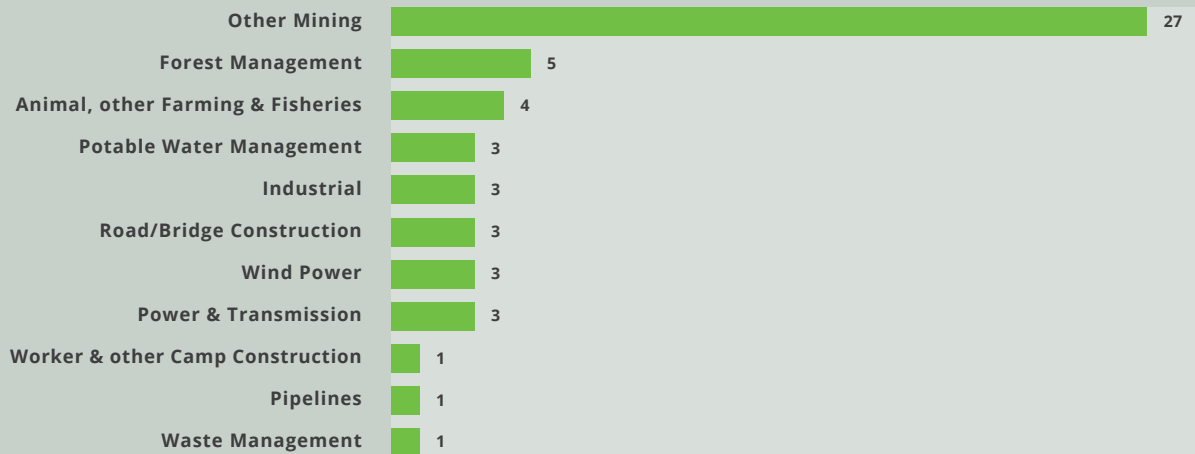
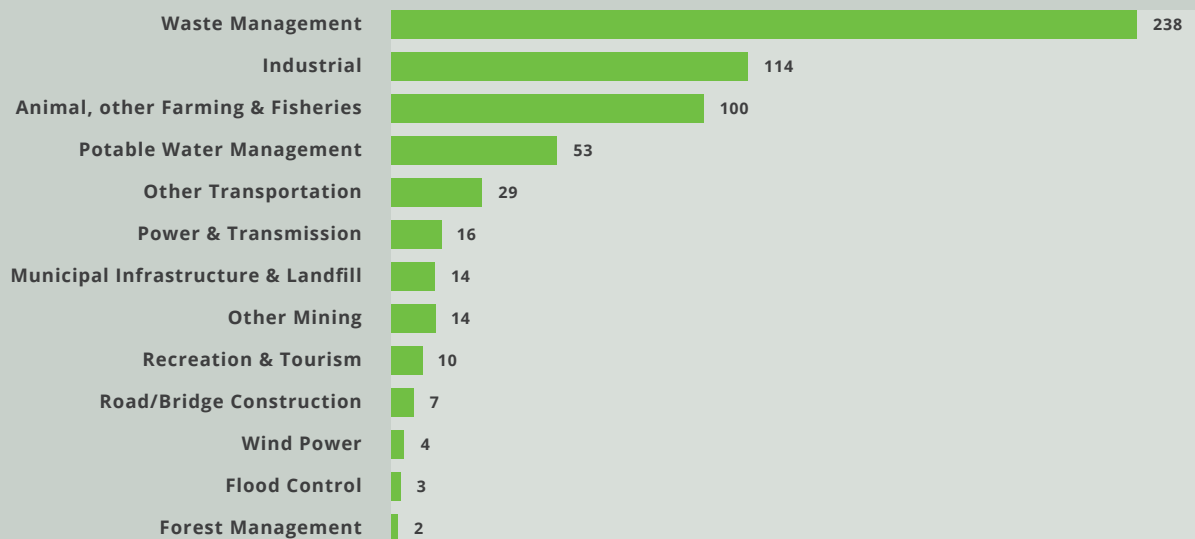
Figure A7: Number of provincially-registered EA projects in British Columbia, 2012 to April 2018.

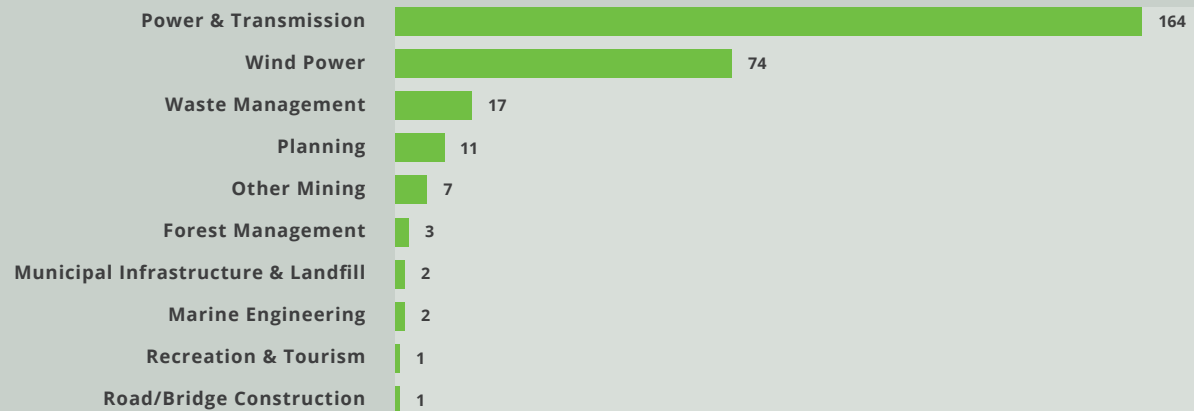
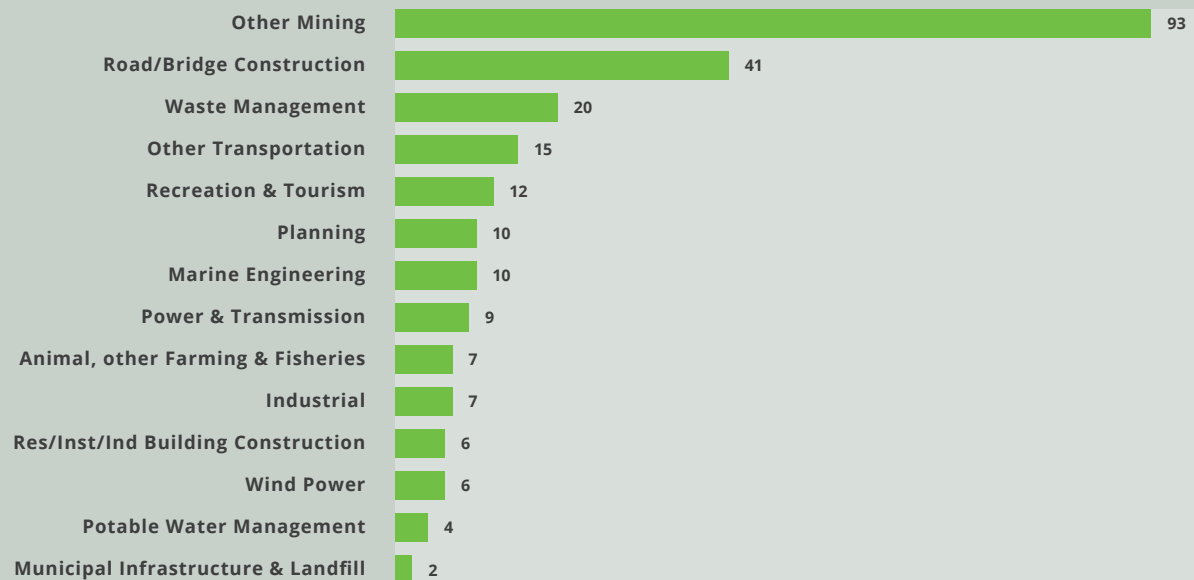


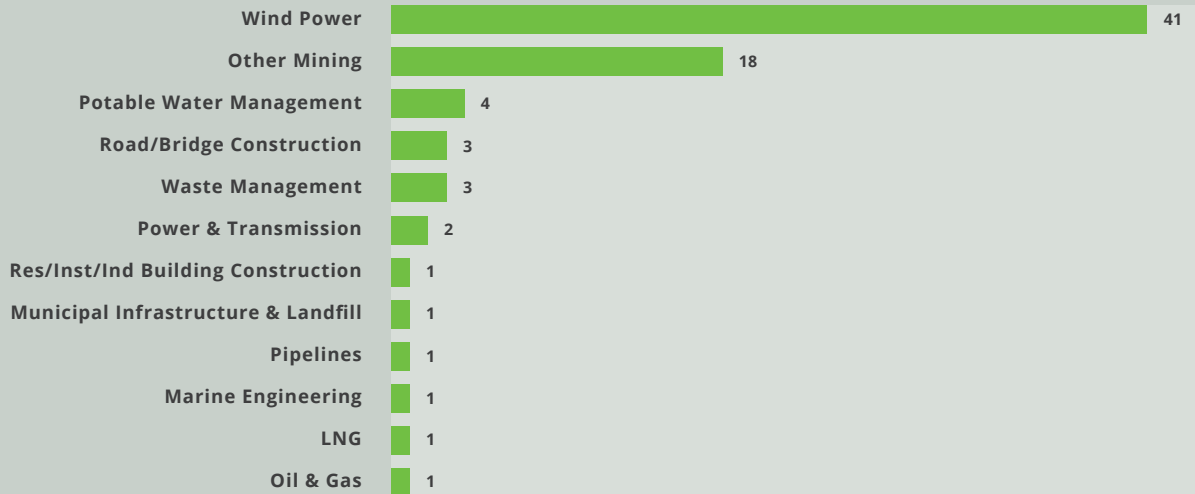
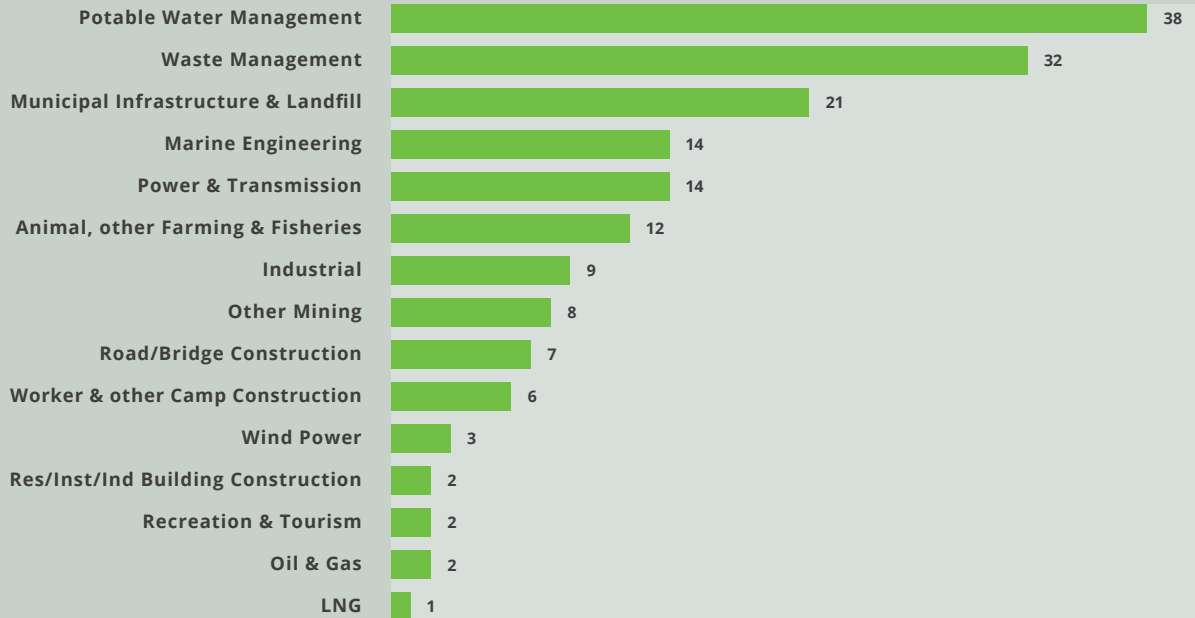
Alberta

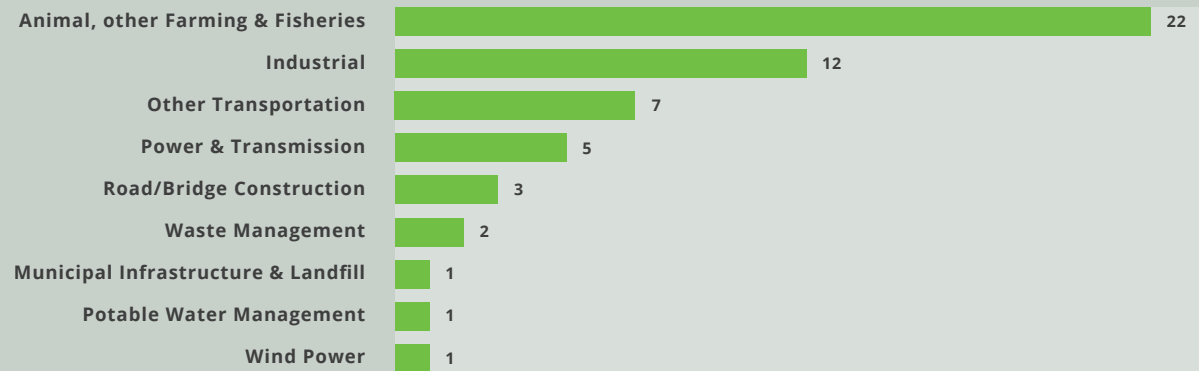
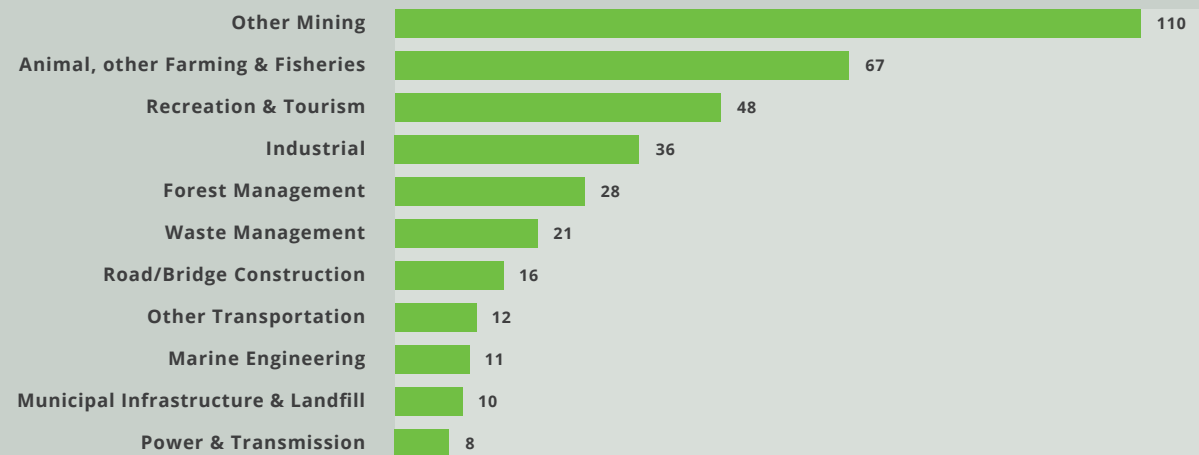
Figure A8: Number of provincially-registered EA projects in Alberta, 2012 to April 2018.



Saskatchewan**Figure A9: Number of provincially-registered EA projects in Saskatchewan, 2012 to April 2018.****Manitoba****Figure A10: Number of provincially-registered EA projects in Manitoba, 2012 to April 2018.**

Ontario**Figure A11: Number of provincially-registered EA projects in Ontario, 2012 to April 2018.****Quebec****Figure A12: Number of provincially-registered EA projects in Quebec, 2012 to April 2018.**

Nova Scotia**Figure A13: Number of provincially-registered EA projects in Nova Scotia, 2012 to April 2018.****New Brunswick****Figure A14: Number of provincially-registered EA projects in New Brunswick, 2012 to April 2018.**

Prince Edward Island**Figure A15: Number of provincially-registered EA projects in Prince Edward Island, 2012 to April 2018.****Newfoundland & Labrador****Figure A16: Number of provincially-registered EA projects in Newfoundland and Labrador (not including offshore oil and gas), 2012 to April 2018.**

Disclaimer

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Sector Snapshot: Environmental Assessments and the Workforce in Canada – November 2018

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The logo for 'eco canada' is centered in the upper half of the image. It features the word 'eco' in a lowercase, sans-serif font, followed by a stylized graphic of a mountain peak with a jagged, angular shape, and then the word 'canada' in the same lowercase, sans-serif font.

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