



Gender-based analysis (GBA+) of
national engineering licensure
assistance and employer awareness
programs

Acronyms

- » **APEGA**: Association of Professional Engineers and Geoscientists of Alberta
- » **APEGNB**: Association of Professional Engineers and Geoscientists of New Brunswick
- » **APEGS**: Association of Professional Engineers and Geoscientists of Saskatchewan
- » **EAP**: Employer awareness programs
- » **DEI**: Diversity, equity, and inclusion
- » **EIT**: Engineer-in-training
- » **EGM**: Engineers Geoscientists Manitoba
- » **GBA+**: Gender-based analysis plus
- » **ISED**: Innovation, Science and Economic Development Canada
- » **LAP**: Licensure assistance programs
- » **NAPEG**: Northwest Territories and Nunavut Association of Professional Engineers and Geoscientists
- » **OIQ**: Ordre des ingénieurs du Québec
- » **PEGNL**: Professional Engineers and Geoscientists Newfoundland & Labrador
- » **PEO**: Professional Engineers Ontario

1.0 Introduction

This document constitutes the final report of the *gender-based analysis (GBA+) of national engineering licensure assistance programs (LAP) and employer awareness programs (EAP)*. In order to support Engineers Canada's Strategic Priority 3: recruitment, retention, and professional development of women in the engineering profession, and Operational Imperative 9 (OP9): promote diversity and inclusion in the profession that reflects Canadian society, Engineers Canada hired PRA Inc. to analyze the current national licensure assistance programming and employer awareness programming provided by the 12 provincial and territorial engineering regulators using a GBA+ lens, and identify best practices. This report summarizes the findings of that analysis and is intended to provide Engineers Canada's senior leadership with recommendations.

The following sections provide an overview of the methodology used to conduct the analysis, a discussion of GBA+ and how it relates to diversity, equity, and inclusion (DEI), a summary of the review's findings, as well as conclusions and recommendations.

Finally, a quick note on nomenclature. Certain regulators use terms such as "engineering interns" or "members-in-training" to denote individuals who have graduated from an undergraduate engineering program and who are in the process of qualifying for their professional licence. For consistency in reporting across regulators, the term "engineer-in-training" (EIT) is used throughout this report to refer to all such individuals.

2.0 Methodology

This project drew on three lines of evidence. First, an environmental scan was conducted that included a review of the regulators' websites, annual reports, policy documents, and other relevant publicly-available material. The environmental scan collected information primarily on organizational considerations related to GBA+, including determining whether the regulators had any committees, working groups, or staff positions related to DEI, whether there were any programs targeted at various diversity groups, details on their mentorship and internship programs (as applicable), and any other relevant diversity events or actions. Second, an online, bilingual survey was sent to each of the regulators to better understand the programs and services they offer to undergraduate engineering students, EITs, and newly licensed engineers. The survey gathered data not only on the types of programs offered but also the number of individuals who benefit from the programs and the types of individuals the programs target. Finally, key informant interviews were conducted with representatives of each of the regulators to gain deeper insights into some of the barriers facing those who wish to become professional engineers, the perceived role of the regulators, as well as various organizational considerations. An interview with a representative of Engineers Yukon could not be conducted.

3.0 GBA+

Defining GBA+

The federal government defines GBA+ as “an analytical process used to assess how diverse groups of women, men, and gender diverse people may experience policies, programs and initiatives” (Women and Gender Equality Canada, 2020). Arguably, the key concept here is “analytical process.” This means that GBA+ is not, fundamentally, about setting targets for the engagement of diverse groups of women, men, and gender diverse individuals. It is rather an introspective process allowing an organization to learn about itself, and the extent to which the activities it carries out effectively reach all intended beneficiaries. In other words, GBA+ is about access, including both barrier-free access to the activities or programs being offered by an organization, and to the benefits that are expected to result from these programs and activities.

GBA+ does not always mean doing more, but it may well mean doing things differently. It is ultimately about being institutionally mindful of what the organization is undertaking, to be as inclusive as possible.

It is also important to consider what falls under the “plus” portion of GBA+. Indeed, people have “multiple, and diverse intersecting identity factors that impact how they understand, and experience [...] initiatives” (Status of Women Canada, 2020). While not all of these factors may be useful for Engineers Canada and the regulatory bodies to consider, it is important to understand that they do exist and to engage in a discussion as to which are most relevant for the engineering profession to consider.

Implementing GBA+

GBA+ is operationalized within an organization’s sphere of control. There may well be a broader range of systemic challenges or barriers in the environment in which an organization operates, and these must certainly be acknowledged. However, the primary goal of GBA+ is to allow an organization to make whatever change may be necessary to ensure that its programs and activities are genuinely inclusive. For instance, Indigenous individuals may face a number of challenges in attempting to become professional engineers. Each institution involved in addressing these challenges must therefore be engaged, from the school system, to the universities, to the regulators, and beyond. The GBA+ process asks these institutions to question whether any of its programming or activities could be altered to ensure that no systemic barrier limits access to Indigenous individuals.

How the *analytical process* is undertaken is something that must be tailored to each organization. Typically, it would involve the articulation of the overall vision that the organization is pursuing and the most predominant challenges that have emerged (i.e. underrepresentation of women and other groups as applicable in engineering). On that basis, the process involves gathering relevant data on the programs and activities being undertaken and the groups and subgroups targeted, including the identification of data gaps and how they can possibly be addressed. The next key step is to engage all key individuals within the organization to develop options and make recommendations. As these changes are implemented, the organization is expected to undertake monitoring and evaluation activities and to make corrections as required.

GBA+ and DEI

Finally, it may be helpful to distinguish between GBA+ and what is commonly referred to as DEI. First, GBA+ is an institutional process, whereas DEI is a broader concept that may be used in a variety of contexts. For instance, a DEI action plan may include a range of actions undertaken to achieve a certain goal; this would be the case of the 30 by 30 initiative. Adopted by Engineers Canada in 2014, this initiative sets a national goal to have 30 per cent of newly licensed engineers be women by 2030. As part of Engineers Canada’s 2019-2021 Strategic Plan, the 30 by 30 initiative was further expanded to include the retention and professional development of women within the profession (Strategic Priority 3) (Engineers Canada, 2018). Another example of a DEI-related initiative is the recent 50 – 30 Challenge launched by Innovation, Science and Economic Development Canada (ISED) in December 2020 that aims to “improve access for racialized persons, people who identify as LGBTQ2, people living with disabilities, as well as First Nations, Inuit and Métis to positions of influence and leadership on corporate boards and in senior management” (ISED, 2021). Participating organizations are encouraged to work towards the goal of having gender parity (“50 per cent”) in their management structures, as well as a significant representation (“30 per cent”) from other under-represented groups, including racialized persons, people living with disabilities and members of the LGBTQ2 community, along with representatives from Indigenous communities.

Achieving these goals involves a range of actors that must act collaboratively. As part of such initiatives, any organization may decide to proceed with a GBA+ to better understand how inclusive its own programs and activities are. Ultimately, GBA+ and DEI are related, but they are of a different nature.

3.1 Demographic profile of regulators

The table below presents some of the key metrics on which most of the regulators gather data. Data on professional engineers is from 2019. Unless otherwise indicated, all remaining metrics are presented as a five-year average (between 2015 and 2019) to avoid any over-representation of outliers.¹ The data comes from the 2020 Survey of Regulators as well as Engineers Canada’s 2020 National Membership Report. While some regulators also gather data on such things as the number of foreign-trained or Indigenous engineers, only gender-based demographic data is presented here for consistency and ease of comparison. No regulator currently gathers data on gender nonconforming persons, Black people and people of color, or other demographic groups.

Table 1: Profile of engineers along the pathway to licensure

4.0 Common barriers and supports

4.1 Barriers on the pathway to licensure

As Canada has a strong demand for engineering both presently and in the future, LAP and EAP are critical to promoting engineering licensure while simultaneously supporting increased diversity and inclusivity within the profession. For such programs to be effective and for them to support Engineers Canada’s 30 by 30 initiative, it is important that they understand and address the barriers facing women and other underrepresented groups. Indeed, those wishing to become professional engineers may face a number of challenges in their pathway to licensure. Though these are presented below by step along the pathway—as undergraduate engineering students, as EITs, and as newly licensed engineers—it is important to note that barriers are not necessarily limited to certain steps and can actually be complementary to those at other points along the path.

The findings below were gathered from interviews with regulators only and are presented in summary form. As such, any insights about students, EITs, newly-licensed engineers, and employers comes from regulators and not directly from any individuals in the aforementioned groups.

4.1.1. Undergraduate engineering students

One of the most common barriers undergraduate engineering students face is simply being unaware of what being a professional engineer entails. This includes misconceptions that with graduation they receive a licence and can begin practising, as well as a general lack of awareness of the licensing process. This is compounded by the lack of mentorship opportunities available to university students.

Similarly, not all of those enrolled in engineering programs wish to be engineers upon graduating. Some may leverage their engineering degree to pursue professions that are not directly related to engineering or may use the degree as a stepping stone to other education (i.e. a law degree).

For students who intend to find employment as engineers, the several-year timeframe before they can apply to be a professional engineer (P.Eng.) can be a deterrent to starting the process. For those committed to the licensure process, they can face challenges finding a job that meets the requirements of their regulator. This is particularly true in more niche disciplines (i.e. aerospace engineering), in smaller regions with fewer job opportunities as well as in regions where the availability of engineering-related jobs is closely tied to the current state of extractive industries. This barrier is closely related to those faced by EITs.

Students in Canada’s three territories face an additional barrier as none of these regions have an accredited university engineering program. As such, high-school students wishing to pursue engineering at the tertiary level must leave their territory to do so.

4.1.2 Engineers-in-training

The single largest barrier faced by EITs is finding a job that enables them to meet their regulator’s requirements. This includes finding a suitable and willing mentor that shares their career development priorities. Many employers may either not have professional engineer(s) on staff (i.e. in small and medium enterprises) or are so large that the EIT works in a different area altogether from the professional engineer on staff. Moreover, according to certain regulators, some EITs have expressed unease with being paired with a mentor that is of the opposite gender. This can prove particularly challenging for EITs who are women as there are far fewer professional engineers who are women and therefore fewer available to serve as mentors.

Another significant challenge is that employers may not incentivize or value professional engineers. This can include a reticence among these employers to cover any costs associated with their licensing application, as well as an unwillingness to adjust an employee’s salary in recognition of their licence. In such instances, there can be a lack of incentive for the EIT to pursue licensure.

In more specialized areas of engineering or in smaller regions, it can be difficult for EITs to find relevant work. Similarly, EITs often face a quandary shared by new graduates in many disciplines, notably that employers want skilled people but new graduates cannot get a job to get the skills needed. In these cases, EITs may decide to forgo the licensure process, may move to another region, or may struggle to find work during the time period outlined by the regulator.

While the timeframes vary by regulator, EITs must generally demonstrate several years' worth of experience over a given period (e.g. four years of experience in a six-year period). EITs who take leave (e.g. sick leave, parental leave) may struggle to meet this requirement especially as the effect of the leave is generally longer than the leave period itself. For example, employers may remove an EIT from key projects in anticipation of their leave, and it may take a while for an EIT returning from leave to be assigned to a project.

While regulators have mechanisms whereby engineers can file complaints against companies who may have breached the regulator's code of ethics (i.e. by engaging in discriminatory practices), several regulators indicated that such mechanisms are rarely, if ever, used by individuals. The complaints process can be perceived as onerous and time consuming for the engineer, and, anecdotally, regulators indicated that the aggrieved individual is likely to change employers to "solve" the issue rather than address it through formal mechanisms.

4.1.3 Newly licensed engineers

The most common barrier facing newly licensed engineers throughout the country is finding relevant work in their field. This is particularly challenging in smaller provinces and outside major urban centres. It is also challenging in those cities where the cost of living is high. This is compounded by employers who are either unwilling to remunerate engineers at a level that recognizes their licence, or who are seeking engineers with several years of experience. Newly licensed engineers facing these challenges are more likely to leave the profession.

4.2 Barriers to entry and retention by demographic group

In order to support Engineers Canada's Strategic Priority 3: recruitment, retention, and professional development of women in the engineering profession and Operational Imperative 9 (OP9): promote diversity and inclusion in the profession that reflects Canadian society, the present review also gathered data on the barriers to entry and retention faced by women and Indigenous persons. These findings are presented in the sections below. Though not identified as a specific demographic group for study under this review, several key informants spoke to barriers of entry and retention faced by foreign-trained engineers. These are discussed in section 4.2.3.

4.2.1 Women

In addition to the aforementioned barriers, women seeking to become professional engineers may face other challenges. In one jurisdiction, it was reported that women leave the profession in the first five years at a rate of 1½ to two times that of men. These additional challenges faced by women can broadly be grouped under three categories that, while presented separately below, are related and mutually reinforcing. These include an engineering culture which is generally unwelcoming towards women, familial constraints, and a lack of mentors, peers, and leaders who are women.

Many of the key informants interviewed indicated that engineering is still a profession that is generally unwelcoming to women. The engineering culture was described as masculine, competitive, and achievement oriented, which can be uninviting. As documented in one regulator's survey, it can manifest in outright ways such as bias, discrimination, bullying, harassment, and assault. It can also be through more subtle ways such as policies or compensation practices that disproportionately impact women. For example, employers may compensate their employees more by the years they have worked than by the competencies they display. Such practices are more likely to impact those who take parental leave. While such conclusions are supported by data on gender and pay equity gathered by one regulator's survey of employers, there is a lack of comparable data in most of the country.

While familial considerations were highlighted by several regulators to be a significant hurdle for women, there is an ongoing debate within the research community as to the validity of this claim. Notwithstanding, for those regulators that cited familial considerations as a hurdle, it was noted that engineering jobs can require significant amounts of travel to remote work sites for long periods of time and, in certain regions, it was noted that there are few part-time jobs and employers generally do not allow employees to work from home or work flexible hours. This can put strains for those with children or other dependents, a task which tends to fall more to women. Key informants indicated that the COVID-19 pandemic has created a shift in more engineers working from home which has had the perceived unintended positive effect of allowing engineers who are women achieve a better work-life balance. Certain key informants expressed a desire for these more flexible working conditions to continue beyond the pandemic as they would reduce barriers not

only for women but potentially other underrepresented groups.

As evidenced by the available data, there is a lack of mentors, peers, and leaders who are women in the engineering profession. Research conducted by one key informant found that women lack a sense of belonging and connection in their workplaces, mostly because there are so few other women. For those already in the profession, this can create feelings of loneliness or tokenism, or reinforcing impressions of glass ceilings. For students and EITs, the lack of female visibility can act as a deterrent as engineering quite literally becomes a profession they cannot see themselves in. Though several regulators have programs in place to have engineers who are women engage in outreach activities such as presenting at high schools, one noted that such initiatives have an unintended negative outcome. More precisely, such outreach appears to nearly always be voluntary and during school/work hours. As such, engineers who are women, especially in the private sector, must forgo some of their billable hours in order to participate. This can put them at a disadvantage compared to male colleagues during performance reviews and salary negotiations. This can be especially burdensome in smaller regions where the pool of engineers who are women is small and so the same individuals may be over-solicited to engage in outreach activities.

4.2.2 Indigenous persons

According to regulators, barriers to Indigenous participation in engineering begin even before university. These are a series of systemic challenges that exist for Indigenous persons that make it more difficult for them to succeed in any profession. In terms of engineering, rural, reserve, and Indigenous schools do not all offer the prerequisites that would enable a high school student to enter a university engineering program. Moreover, a post-secondary education may not always be a priority for Indigenous parents who may prioritize traditional ways of knowing. There are also socio-economic barriers and those related to remoteness. For example, a regulator might only organize outreach activities to high schools in urban centres.

For Indigenous persons who do enroll in undergraduate engineering programs, the transition to the job market can be sudden and there are a lack of Indigenous-targeted supports. As with women, there is a lack of Indigenous engineers which makes it challenging for younger Indigenous students and engineers to find mentors or role models. And like women, not seeing others like yourself in positions throughout an organization can result in a lack of connection and feeling of belonging. As evidenced by focus groups with Indigenous engineers conducted by one regulator, many report a feeling of tokenism and they do not feel like there is a real engagement on the part of the employer to support their integration or career progression.

Several key informants also noted that engineering was used as a tool of colonization, and that it is challenging to encourage Indigenous participation in such an industry, especially when there is ongoing discrimination. While some regulators are seeking to overcome this obstacle by raising awareness of the value of the profession to Indigenous people or by building relationships with local bands and councils, most regulators do not offer supports or initiatives that specifically target Indigenous persons. Part of this is due to a lack of data; most regulators do not consistently gather data on Indigenous students, EITs, or licensed engineers. This is partially attributed to challenges in formulating a proper definition for an Indigenous person while others are attributed to an unwillingness among Indigenous persons to self-identify for fear of being discriminated against.

4.2.3 Foreign-trained engineers

The key informants that spoke about this subgroup agreed that foreign-trained engineers face more barriers than Canadian-educated engineers. First, the process of recognizing a foreign-trained engineer's education and experience can be lengthy, costly, and discouraging. For example, since regulators generally require a certain number of years' experience in Canada, experienced foreign-trained engineers may have to accept a job at a lower level or salary than they otherwise would be offered for their level of experience. Some key informants indicated that certain employers take advantage of this situation to pay foreign-trained engineers significantly less than Canadian employees with a licence.

Integration into Canadian society can also be difficult. This includes not only having to adapt to Canadian culture and potentially having to learn a new language but also having to learn about and navigate Canada's engineering system (i.e. provincial and territorial engineering regulation, licensure processes and requirements, etc.). One key informant noted that a lack of coordination with provincial ministries responsible for immigration can create inconsistencies in the process and can lead to confusion. For example, a government department may have issued a work visa to a foreign applicant despite the fact that the individual might not meet the engineering regulator's requirements to work.

It was further noted that additional barriers can be found at the intersection of gender and foreign status as women are more likely to have familial responsibilities and less interpersonal support networks than Canadian women.

4.3 Supports

Cognizant of the aforementioned barriers, the 12 regulatory bodies offer a variety of supports, programs, and initiatives to undergraduate engineering students, EITs, and newly licensed engineers. Given that these supports are but a small part of the factors that influence the attraction of students and the retention of engineers to the profession, it is challenging to say with certainty the extent to which these supports are helping to creating a more robust pathway to licensure. Notwithstanding, while the value of these supports cannot be measured, regulators consulted through this review agreed that these initiatives and programs are helpful.

As can be seen in Table 2, nearly all regulators offer lectures and talks to undergraduate engineering students on the licensure process. Most regulators also offer student memberships to their association, as well as scholarships, grants, or other financial supports to students. Several regulators provide guidance to students through a mentorship program. While it appears that students pay reduced membership fees and that other supports are offered for free, the survey and interviews did not gather enough data to make such statements conclusively.

The vast majority of regulators organize networking opportunities, professional development sessions, as well as training, workshops, and information sessions for EITs to help them navigate the licensing process (see Table 3). Several also seek to facilitate the technical mentorship requirement by recruiting volunteer mentors and pairing them with EITs. Career mentorship is less common, but regulators said they are trying to revise their mentorship programs, so they go beyond technical mentoring to provide broader experience. Some regulators expect both technical and career mentorship to be provided by the employer and a formal mentorship program is not necessary. However, it is unclear whether the regulators are consistently gathering data from employers as to whether these mentorship programs are offered. Some regulators offer awards or recognition to EITs, while only a couple offer them financial supports (i.e. reduced membership fees if they attend certain workshops, waiving membership dues if graduates register within a limited time frame after graduation) or provide feedback on their resumes or application package. It is unclear based on the available data whether such supports are offered free-of-charge to EITs.

The supports offered to newly licensed engineers are very similar to those offered to EITs, as evidenced in Table 4. Two differences worth noting are that most regulators have job boards for newly licensed engineers and that none offer financial supports to them. It is unclear based on the available data whether the supports presented in Table 4 are freely offered to newly licensed engineers. Regulators are more likely to offer these supports to all individuals as opposed to simply women, Indigenous persons, or foreign-trained individuals. This will be discussed further in Section 5.0 as it pertains to the regulators' perceived role.

Several of these initiatives appear to have been quite successful and are worth noting. While some of these examples were highlighted in interviews as best practices, information on other initiatives was gathered through a review of publicly-available information such as regulators' annual reports. This list is not intended to be exhaustive nor cover every regulator:

- »For the past four years, Engineers PEI has collaborated with UPEI's Faculty of Sustainable Development Engineering (FSDE) on the Promoting Girls in Research in Engineering and Sustainability (ProGRES) initiative. ProGRES is a five-week summer research opportunity at the FSDE for high school girls going into grades 11 and 12. Students are paired with a faculty researcher, graduate student, or undergraduate student who is a woman and who acts as a direct mentor for the student's independent research project. The initiative also provides students with opportunities to learn more about engineering and what engineers do on a daily basis, and meet with other EITs and members who are women. They are hosted by the Women in Engineering Committee for various networking opportunities and have presented their projects at the Engineers PEI annual general meeting. There are currently seven engineering students at FSDE who are women who were supported through the ProGRES initiative, and the initiative appears to have been very well received by students and faculty members alike. The initiative is one that could be extended to other demographic groups (i.e. Indigenous students) or to other regions.
- »Recognizing that EITs may struggle to find a mentor within their company, Professional Engineers Ontario's (PEO) created a LAP that links professional engineers licensed with PEO with EITs to provide the EITs with guidance and support as they progress towards obtaining their professional engineering licence. The LAP is offered by and run through PEO's local chapters. Thus, an interested EIT could reach out to their local chapter and seek to be paired with a volunteer mentor. While the LAP is not designed to help an EIT find employment, the mentor can help guide the EIT through their work experience report and can answer questions the EIT might have on the licensure process. The LAP has been well-received by EITs, especially by those who would otherwise struggle to find a suitable mentor. Engineers and Geoscientists BC offers a similar mentorship program which allows professional engineers to impart their skills and knowledge to EITs in a variety of areas including career counselling, entrepreneurship, retirement and succession planning, and establishing a professional network. Indeed, technical or career mentorship is one of the most common supports provided by regulators for EITs.
- »After noting that EITs who took leave (i.e. sick leave, parental leave) struggled to demonstrate the required four years'-worth of experience over a six-year period, APEGA sought to mitigate this barrier by automatically extending the application period to eight years and allowing EITs to apply for additional extensions equivalent to the time they were on leave. APEGA also reduces an EIT's dues by 25 per cent while they are on leave, and published a document on managing the transition to and from leave, which includes information on such things as the conversations to have with human resources, how to stay in touch with the employer, how to prepare for a return, and other topics.
- »The Ordre des Ingénieurs du Québec (OIQ) offers a variety of supports for foreign-trained engineers to better support their integration into Quebec society. For example, since 2003, the OIQ has collaborated with the Centre R.I.R.E. 2000, a not-for-profit organization based in Quebec City, on the *Programme d'accès rapide à l'OIQ*. This program supports foreign-trained engineers in preparing for their accreditation exams and gives them training to improve their employability in the context of the Quebec job market. Moreover, since 2016, the OIQ offers those with refugee status a reduction in admission costs, including application and examination fees. Finally, the OIQ is developing an action plan that would support collaborations with community or not-for-profit organizations. Under the action plan, the OIQ could refer foreign-trained engineers who are struggling to find work or to adapt to Quebec society to an organization that is better equipped and mandated to deal with such

requests.

4.4 Employer Awareness Programs

While this review was intended to gather information on both LAP and EAP, significantly less information was available on EAP. Part of this pertains to the fact that, while regulators may engage in outreach and engagement sessions with employers, this does not always happen under the umbrella of a “program” per say. This explains why, in the responses to the survey presented in Table 4, only one of the regulators indicated that they have an EAP. Another reason may be tied to regulators’ perception that they have a limited amount of influence over employers and that, as such, their efforts to promote licensing are better spent on individuals. This is discussed further in section 5.0.

Engineers and Geoscientists BC has an Accredited Employer Program that certifies employers who employ EITs and work with Engineers and Geoscientists BC to offer work environments that support EITs in their efforts to satisfy professional experience requirements in order to obtain their license⁷. Employers develop their own EIT training programs and must renew their accreditation at the end of each three-year term to remain in the program. Other regulators offer a variety of programming targeted at employers. To take but one example, PEO and its chapters organize numerous events and presentations to speak with a variety of stakeholders on the value of licensure including private companies and employment agencies. PEO also organizes workshops for companies that deal specifically with the EIT process and what is needed from the employer. PEO is also working with employers who agree to track and share data on the per cent of new engineering recruits who are women, the per cent of engineering recruits who are women who obtain their licence, and the per cent of engineers who are women in leadership positions (C-suite; management). Such activities and initiatives are spearheaded by PEO’s 30 by 30 Task Force. The Task Force has published an action plan⁸ and a work plan⁹ on its efforts in this regard, and has held action planning sessions with employers.¹⁰

Table 2: Programs for undergraduate engineering students

Table 3: Programs for engineers in training

Table 4: Programs for newly licensed engineers

5.0 Role of the regulators

All regulators indicated that their primary role is to regulate the profession in their respective regions, and to ensure that the licensing process protects the public. Similarly, raising awareness about the value of licensure and providing information on the licensing process and the profession more generally were highlighted by all as central elements of their role.

There was no consensus as to the role regulators should or can play with respect to increasing the diversity of the profession. Many regulators see their role largely focused on ensuring that those who apply to be professional engineers are properly vetted before receiving a license. In this view, it is not the role of the regulator to advocate for DEI or to offer supports or programs that target any group of people over another. A smaller number of regulators firmly hold that DEI considerations fall within the regulators’ mandate and code of ethics.

Some believe that, as regulators, they can do much more to encourage adoption of policies and practices that embrace DEI and to recognize when existing policies and practices act as barriers to underrepresented groups. As such, it becomes an issue for the regulator since it pervades that which it regulates. Several regulators suggested they could: outline expectations of private employers and their employees; collect more detailed data on members; encourage private employers to publicly report on diversity and inclusion metrics to increase accountability; provide more information to volunteers, regulatory staff, and employers about why DEI is important; and encourage workplaces to take training in things like implicit bias. Some regulators argued that the members of the engineering profession should reflect the public it serves and, if it does not, it is the regulator’s job to help make that happen. In this view, it is not necessarily about diversity and *inclusion* but rather about addressing system *exclusion*. The role of the regulator is to put the public interest first; by systematically excluding certain groups and preventing the profession from reflecting the public it serves, the profession may be blocking individuals who could be some of the profession’s best talent.

It was also suggested that at a minimum, the regulator itself should be an example for its members. To this end, some regulators have looked at their own organization from a DEI perspective. For example, one regulator engaged a consultant do a review of their committees from a DEI perspective. These reviews examine such things as committee terms of reference, how committee positions are recruited and filled, the registration process, application forms, employee policies, volunteer policies, etc.

Regardless of a regulator’s perceived role in supporting DEI, there was agreement that regulators are but

one actor in the engineering ecosystem and that they actually have limited ability to affect significant change with respect to DEI considerations. In particular, three primary areas of the ecosystem were identified to fall outside of the regulators' sphere of influence. First, there is little regulators can do to increase the enrollment of underrepresented groups in undergraduate engineering programs. Second, regulators have no control over the number and types of foreign-trained engineers pursuing licensure in Canada. Third, employers play an outsized role in shaping the culture of the profession as well as in creating policies and work environments that do or do not support DEI. Regulators currently do not have any control over employers and only very limited influence over them in some cases. While some regulators seek to increase awareness of the value of licensure and the importance of DEI to employers through such things as workshops and presentations, the extent to which employers are committed to DEI seems primarily dependent on whether senior leadership and management within those organizations are committed to DEI and whether it is a strategic goal of the organization.

Several regulators also expressed reservations about creating any policies or programs that could be perceived to privilege one group over another, and noted that there has been reluctance from their membership to do so. That being said, others said regulators have a leadership role to play in this regard.

5.1 Member data

All regulators said it was important that they better understand who their members are. Most regulators collect only information about gender. Without gathering diversity information, any organization will struggle to know how diverse it actually is. While most regulators indicated that more effort could be made to gather such information, many had not yet determined how to go about it (i.e. questions built into licensing documents or gathered in a survey). The former was seen as intrusive and could even be seen as discriminatory. Further, some say that members do not like being asked, as they believe it highlights their differences or will make them susceptible to discrimination. Other regulators worry that a survey will not gather accurate information, though one regulator indicated that they were planning such a survey in the near future. Another regulator has formulated a list of information that it is recommending should be gathered at each step of the engineering experience (i.e. as students, EITs, and professional engineers). The recommended list includes: gender (including non-binary genders); Indigeneity; people of colour; persons with disabilities; LGBTQ+; foreign-trained; and caregiving responsibilities. In all cases it would allow people to voluntarily self-identify. It was said that knowing this information is the first step to influence future change.

6.0 Ability to achieve 30 by 30

In light of the limited extent of regulators' influence over the engineering ecosystem, most regulators questioned how achievable Engineers Canada's 30 by 30 initiative is. Those in smaller regions were more likely to say the goal was achievable, though cautioned that the low annual number of newly licensed engineers means that the addition of even one or two women can alter the proportions significantly, thus distorting the data. One regulator said they might achieve the goal because their university has set a goal of 40 per cent of their engineering and geoscience undergraduates to be women by 2030. Other regulators have developed action plans towards the goal. Most recently, the impacts of COVID-19 (i.e., on student job placements, co-op programs, and internships) have also been identified as reducing the ability to achieve the goal.

However, several regulators stressed that, even if the goal is not met, it is valuable in identifying a target and encouraging collective action toward it. Similarly, while 30 by 30 focuses on women, several of those interviewed were hopeful that programs and initiatives put in place for 30 by 30 will result in positive effects not only for women but also for other underrepresented groups.

For most regulators, a lack of resources was not identified as a significant barrier to reaching this goal. Although with resources more could probably be done to support the initiative (i.e. collect better data and analyze it from a variety of perspectives, organize a speaker series, do more outreach and advertising, bring leaders together work on opportunities, etc.), the achievement of the goal is dependent on a variety of other factors and actors. However, for some smaller organizations, additional human resources for outreach activities could prove helpful.

Although all of the regulators had previously signed on in support of the 30 by 30 goal, a few regulators questioned the 30 by 30 goal and reproached it for being too focused on a precise metric in a given year and for not measuring inclusion. These regulators maintained that increasing the number of newly licensed engineers who are women did not necessarily translate to those women staying in the profession, ascending to leadership roles or creating a culture of inclusion and respect.

7.0 Organizational factors that support DEI

Despite having a limited scope within which to influence system-wide change, regulators are committed at an organizational level to the principles of DEI and many are actively seeking to gather data from their membership, revise existing policies and procedures, and implement new programs and initiatives that will support DEI. DEI considerations are integrated into regulatory bodies in a variety of ways including: committees, working groups or staff positions related to DEI (e.g. Director of Diversity and Inclusion, Equity, and Diversity Committee); training to staff on such things as unconscious bias; and awards in recognition of those who have demonstrated noteworthy support for diversity in the profession.

For organizations wishing to make a concerted effort to address DEI, best practices or facilitating factors were identified and are listed below.

- »In order to get DEI initiatives started, it is important to have a **DEI champion with institutional power** within the organization. For example, some of the regulators who have considered DEI more carefully have done so because a president, CEO, council member, manager, or committee head spearheaded the initiative.
- »Closely related, regulators would benefit from **dedicated and permanent financial and human resources**, if these are not already present, who not only understand the language of DEI but who also have institutional support to enact change. When a DEI champion is a volunteer or does not have access to consistent, dedicated funding (i.e. must spend time submitting grant and funding applications), they are not able to devote themselves as fully or efficiently to reviewing policies, creating programs, offering training, etc. Similarly, without meaningful powers or support from senior leadership and management, any DEI-related position is hobbled.
 - »For example, Engineers Geoscientists Manitoba's council voted to include as one of its strategic policy "ends" that *practitioners reflect the diversity of the public*. This end not only grafts the 30 by 30 goal onto Engineers Geoscientists Manitoba's strategic operations but also calls for the increased representation of Indigenous persons among its membership. The council also voted to create two staff positions related to DEI, including making the Indigenous Professionals Initiative Committee Director a permanent staff position. Such initiatives were supported through an increase in member dues. While such a model may not work for all regulators and though there may be some opposition from the membership to increase dues to support DEI-related work, Engineers Geoscientists Manitoba's example is one other regulators might wish to consider.
- »The extent to which 30 by 30 has been **operationalized and institutionalized** within the vision of the regulator is also critical. For example, some regulators have included DEI considerations in their organization's strategic aims and goals, which helps to ensure its sustainability.
- »Given the critical role universities play in attracting and enrolling women and Indigenous students to engineering programs, a **strong, sustained relationship with the local university(ies)** can prove to be very beneficial to regulators, as appears to be the case with Engineers PEI and the University of PEI, and several other regulators. While this best practice may be able to be successfully replicated in other jurisdictions with a small number of universities such as Saskatchewan, it will be more challenging in larger regions such as Quebec or Ontario, and impossible in the three territories as they do not have an accredited university engineering program.
- »The importance of **dedicated and passionate volunteers** among the organization's membership was also highlighted as an important factor in ensuring the success of initiatives. However, it was cautioned that volunteers should not be over-solicited as, especially in smaller jurisdictions, volunteers are already asked to do a lot and may suffer from burnout.

While the various supports are a necessary part of any attempt at overcoming these barriers, a key informant noted that they are not sufficient to overcome systemic barriers present in the profession.

8.0 Conclusions and recommendations

The key conclusions that lead to recommendations for Engineers Canada are presented below. Note that these recommendations are not placed in any specific order of importance.

GBA+

As noted in section 3.0 of the report, GBA+ is an institutional process that can be applied to any processes and activities in which an organization is involved, such as LAP or EAP. As for DEI, it is a broader concept that may be used in a variety of contexts. The 30 by 30 goal falls more squarely under DEI than GBA+. Ultimately, to support any DEI-related initiative that they elect to pursue, Engineers Canada and the regulators would benefit from proceeding with an explicit GBA+ process to systematically learn and document how their current activities and processes are contributing or limiting the contribution that each organization can make to achieving greater diversity, equity, and inclusion.

On that basis, the following two recommendations are proposed.

Recommendation 1: Engineers Canada and the 12 regulators should engage in a GBA+ review of their activities, policies, procedures related to licensure and employer awareness to support a full alignment with their collective goals on diversity, equity, and inclusiveness. It is likely that the analytical process would need to be tailored to each organization, though would generally involve the articulation of the overall vision that the organization is pursuing and the most predominant challenges that have emerged, the collection of relevant data, the development and implementation of recommendations, and the monitoring and evaluation of those activities.

Recommendation 2: In collaboration with the 12 regulators, Engineers Canada should develop a strategy for data collection across the country that reflects the needs of the regulators and respects their varying capacity to collect such data. An informed discussion with all these stakeholders will be needed to determine the variables on which to gather data, as well as the best mechanism to gather the data (i.e. an annual survey of members, including demographic-based questions as part of annual membership renewal, etc.).

30 by 30

As concerns Engineers Canada's 30 by 30 initiative more specifically, Engineers Canada recognizes that they and the 12 regulators are but one of many actors in Canada working to increase the representation of women in engineering, and there are a host of external factors that will affect the achievement of this goal. To that end, Engineers Canada works closely with over 50 per cent of the academic institutions that offer accredited engineering programs, as well as many engineering employers. Engineers Canada also collaborates and engages with government departments and agencies such as the Natural Sciences and Engineering Research Council of Canada (NSERC) (i.e. Chairs for Women in Science and Engineering), as well as with a variety of actors in the not-for-profit sectors, including the Canadian Coalition of Women in Engineering, Science, Trades and Technology (CCWEST) and the Society for Canadian Women in Science & Technology (SCWIST), as well as hEr VOLUTION and TechGirls Canada. Notwithstanding, there is an opportunity for Engineers Canada to work more closely with national engineering employers as this is a stakeholder group identified by the regulators as falling largely outside of their sphere of influence. However, given that Engineer Canada is mandated with serving the regulators, it will be important that any actions undertaken by Engineers Canada to engage with employers be directed by the regulators.

Recommendation 3: Provided Engineers Canada receives such a mandate from its regulators, it is recommended that Engineers Canada strategically target national engineering employers as an important stakeholder group in the engineering ecosystem, recognizing that they play a critical role in the representation of women in the engineering profession and thus, in the achievement of the 30 by 30 goal. Conversely, should the regulators wish to undertake such engagement themselves, Engineers Canada could support these efforts.

References

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Endnotes

1. Data from 2014 to 2019 for each regulator, as presented in Engineers Canada's 2020 National Membership Report is presented in Appendix A.
2. For ease of review, percentages have been rounded to their nearest whole number.
3. The data presented here is from 2020 and includes the total number of individual members. Members include professional engineers but also EITs and those with a limited license. As such, the data presented includes more types of engineers than does the data in other jurisdictions.
4. "N/A" indicates that, while the regulator does offer student memberships, no data was provided on the number of members. "-" indicates that the regulator does not offer student memberships.
5. The data presented here represents a four-year average (from 2015 to 2018) as data on female students was not available in 2019.
6. The number for APEGA's newly licensed engineers is from Engineers Canada's National Membership Report. It represents the five year average from 2014 to 2018.
7. [Accredited-Employer-MIT-Program-Guide.pdf.aspx](#) (egbc.ca)
8. https://www.peo.on.ca/srv/drupal-engineerscanada-website/src/sites/default/files/2019-08/30by30_ActionPlan.pdf
9. https://www.peo.on.ca/srv/drupal-engineerscanada-website/src/sites/default/files/2019-11/30by30TF_WorkPlan.pdf
10. <https://www.peo.on.ca/srv/drupal-engineerscanada-website/src/sites/default/files/2019-12/30by30-PEO-Action-Planning-Employers.pdf>
11. Scholarships through APEGA's charitable foundation.
12. Volunteer opportunities.
13. Photocopying is provided free-of-charge at Engineers PEI's office.
14. Engineers Yukon has an EIT Committee that seeks to build the EIT community.
15. Volunteer opportunities.

Appendix A

Number of EITs by regulator: 2015 to 2019