

SUSTAINABILITY

APEGBC PROFESSIONAL PRACTICE GUIDELINES

V1.1

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■ DEFINITIONS

The following definitions are specific to these *APEGBC Professional Practice Guidelines - Sustainability* (“Sustainability Guidelines”). All references in the text to these terms are italicized in the first instance.

APEGBC

The Association of Professional Engineers and Geoscientists of British Columbia.

APEGBC professional(s)

Professional engineers, professional geoscientists, engineering licensees, and geoscience licensees.

■ SUSTAINABILITY AND APEGBC PROFESSIONALS

WHAT IS SUSTAINABILITY?

A sustainable society meets the needs of people in a resilient economy without compromising the planet's ecological integrity or the needs of future generations. Sustainability has three pillars that must be integrated in a balanced way:

- a) environmental: to stay within the biophysical carrying capacity of our region/country/planet (e.g. minimize resource use, minimize waste, protect nature from degradation);
- b) social: to maintain and protect quality of life and the values that we aspire to live by; and
- c) economic: to ensure that an adequate material standard of living is provided for all members of society.

HOW DOES IT RELATE TO PROFESSIONAL ENGINEERING AND GEOSCIENCE

APEGBC professionals have a significant role to play in the development of a sustainable society through their professional practice. Our actions directly and indirectly shape the world we live in, including the resources we use, as well as the health, safety, environment, and wellbeing of the public. APEGBC professionals make decisions and provide leadership to our colleagues, clients, employers, decision-makers and the public in the development, implementation, operational life spans, and decommissioning of engineering and geoscience projects, products, processes, or systems.

We have a responsibility to the public, consistent with the APEGBC Code of Ethics (the "Code of Ethics"), to provide sustainable solutions that adhere

to the basic pillars of sustainability (environmental, social and economic). This requires that we consider the long-term consequences that flow directly and indirectly from our actions.

APEGBC professionals must not make promises of results for sustainable solutions as this will probably negate their professional liability insurance coverage.

These APEGBC Sustainability Guidelines are an update of APEGBC's former Guideline on Sustainability, originally adopted in 1995. APEGBC professionals are encouraged to view their work through the "lens of sustainability", using these Sustainability Guidelines to assist them where appropriate. Sector-specific guidelines for sustainable engineering and geoscience practice are also available on the APEGBC website.

■ THE SUSTAINABILITY GUIDELINES

Within their scope of professional practice, APEGBC professionals have a responsibility to:

2.1 GUIDELINE 1: MAINTAIN A CURRENT KNOWLEDGE OF SUSTAINABILITY

Maintain a level of competence on matters of sustainability related to the APEGBC professional's area of expertise, and seek additional expertise as necessary. The knowledge, concepts and opportunities for sustainable solutions are rapidly evolving and APEGBC professionals should strive to keep skills up to date, and advance the understanding of sustainability in their field of practice.

2.2 GUIDELINE 2: INTEGRATE SUSTAINABILITY INTO PROFESSIONAL PRACTICE

Integrate sustainability considerations into professional practice, reflecting the APEGBC Code of Ethics' requirements to hold paramount the safety, health and welfare of the public and the protection of the environment. APEGBC professionals must consider the combined environmental, social and economic aspects that take into account the direct and indirect impacts over the full project life-cycle.

2.3 GUIDELINE 3: COLLABORATE WITH PEERS AND EXPERTS FROM CONCEPT TO COMPLETION

At key stages of the project life-cycle, collaborate with peers and experts across disciplines to identify appropriate alternatives and new opportunities for sustainable results.

2.4 GUIDELINE 4: DEVELOP AND PREPARE CLEAR JUSTIFICATIONS TO IMPLEMENT SUSTAINABLE SOLUTIONS

Discuss opportunities and document decisions made related to the integration of environmental, social and economic metrics. These discussions should occur early enough to enable the client or employer to make informed decisions about how to implement an appropriate level of sustainability considerations in the task or projects, products, processes, or systems.

2.5 GUIDELINE 5: ASSESS SUSTAINABILITY PERFORMANCE AND IDENTIFY OPPORTUNITIES FOR IMPROVEMENT

Identify opportunities to improve knowledge and professional practice related to sustainability, where best practice is to assess actual performance of implemented solutions against the original design goals and metrics.

An amplification of each guideline is provided in Appendix I.

■ APPENDIX I SUSTAINABILITY GUIDELINE AMPLIFICATIONS

SUSTAINABILITY AND APEGBC PROFESSIONALS

What is Sustainability?

The most widely quoted definition of sustainability and sustainable development was given by the United Nations' Brundtland Commission on March 20, 1987:

“Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs.”

Since that time, the definition and scope of sustainability has expanded to encompass all aspects of human activities.

Sustainability requires us to be smart about managing our resources and impacts, with the long term in mind. In other words, we need to think about the way we use our natural, social, and economic capital so that we don't use them up too fast or make conditions worse for others while we benefit ourselves (“others” can mean those in different places around the world or future generations).

How Does it Relate to Professional Engineering and Geoscience?

This preamble emphasizes the relevance of the Sustainability Guidelines to the scope of an APEGBC professional's task and work responsibilities. APEGBC professionals must consider these Sustainability Guidelines in their work; the application of the Sustainability Guidelines is, however, a matter of judgment.

The concept of sustainability in the practice of professional engineering and geoscience is not new. Sustainability is already a key element to our professional practice where we carry out our roles considering ethical,

environmental, social and economic challenges. By continually gathering new knowledge, developing new materials and technologies, and using more sophisticated decision-making methods, we deliver economic benefits, minimize negative environmental impacts and improve societal wellbeing.

APEGBC professionals already have an explicit mandate to protect public welfare and the environment. The first principle of our Code of Ethics states:

“Professional Engineers and Geoscientists shall hold paramount the safety, health and welfare of the public, the protection of the environment and promote health and safety within the workplace.”

Two of the three components of sustainability (social and environmental) are explicitly captured by this first principle of the Code of Ethics. The third component of sustainability (providing a healthy economy) is implicit, because it lies at the core of what professional engineers and geoscientists do. Incorporating sustainability requires balancing environmental, social and economic interests.

These Sustainability Guidelines are intended to help clients, employers and stakeholders understand that sustainability considerations are a fundamental part of the proper practice of professional engineering and geoscience. By demonstrating that the task requires specialized knowledge and responsibility for life, property and the environment, these Sustainability Guidelines help reinforce the public's appreciation of APEGBC professionals as professionals who act in the public interest.

These Sustainability Guidelines serve to explain APEGBC professionals' responsibilities related to society and the environment (as listed in the Code of Ethics), and to provide advice and encouragement to APEGBC professionals in delivering more sustainable solutions.

APEGBC – A Pioneer in Sustainable Engineering and Geoscience

In 1995, APEGBC released the first sustainability guidelines for APEGBC professionals¹. The present document updates these original guidelines, while acknowledging and building upon the ground-breaking work that APEGBC and its Sustainability Committee did at the time.

Sustainability has become an important issue for engineers and geoscientists across Canada and internationally, not just in British Columbia.

Engineers Canada is the national organization of the 12 provincial and territorial associations that regulate engineering in Canada. Engineers Canada released the National Guideline on Environment and Sustainability² in 2006 which APEGBC's Council endorsed in October 2011.

Limitations

These Sustainability Guidelines set out general concepts and principles to inform APEGBC professionals on why sustainability is relevant in professional practice.

¹ APEGBC (1995) "Guidelines for Sustainability". Available online at: apegbc.ca

² Engineers Canada "National Guidelines on Environment and Sustainability". Available online at: engineerscanada.ca

■ GUIDELINE 1: MAINTAIN A CURRENT KNOWLEDGE OF SUSTAINABILITY

Maintain a level of competence on matters of sustainability related to the APEGBC professional's area of expertise, and seek additional expertise as necessary. The knowledge, concepts and opportunities for sustainable solutions are rapidly evolving and APEGBC professionals should strive to keep skills up to date and advance the understanding of sustainability in their field of practice.

Sustainability is a complex concept that involves careful consideration and balancing of three pillars: environmental, economic and social. APEGBC professionals have identified “lack of knowledge of how to employ sustainability” in their practice as one of the main barriers to the integration of sustainability in their work. Guideline 1 emphasizes that ongoing and continuous professional development is an important aspect of sustainability, because the state of the art is constantly advancing. Put simply, Guideline 1 recommends that APEGBC professionals “be current”, so that they are knowledgeable about up-to-date sustainability concepts, technologies and approaches to practice in their field. The requirement for APEGBC professionals to maintain a current knowledge of sustainability is embodied in the sixth principle of the Code of Ethics, which states that:

“Members and licensees shall keep themselves informed in order to maintain their competence, strive to advance the body of knowledge within which they practice and provide opportunities for the professional development of their associates.”

The APEGBC professional's understanding of sustainability will evolve as his or her appreciation and understanding of natural, economic and social systems and their

interrelationships develop through practice. Currently, many APEGBC professionals have an understanding of, and support, the individual pillars of sustainability, but may not be familiar with relationships between these pillars and their own professional practice. Achieving sustainability, however, requires an appreciation of the complex relationships between each of the three pillars of sustainability.

As sustainable solutions are becoming an expectation of Canadian society, APEGBC professionals are increasingly being asked by their clients, their employers and/or the public to demonstrate competence at the most current level of sustainable practice. There is an opportunity for APEGBC professionals to be leaders at the provincial and national levels. Requirements stipulated by codes of practice are conservative by nature, so APEGBC professionals should advocate for new standards where there are clear links to demonstrated improvements in sustainable approaches and solutions. While practicing sustainable design will ultimately become the accepted standard, the best professionals seek out the next level of performance, as boundaries are continually challenged.

By maintaining a current knowledge of sustainability, guided by sound, peer-reviewed science as it relates to professional engineering and geoscience practice, APEGBC professionals provide greater long-term value by delivering smart sustainable solutions that extend across disciplinary boundaries and address the wider impacts of the project.

Additional benefits to APEGBC professionals and the public may include:

- Reductions in energy and material use, waste production, and operational costs

- Improvements in the reputation of APEGBC professionals as being proactive practitioners of sustainable professional engineering or geoscience, which is increasingly important to clients and stakeholders and is also a basis for differentiation on the value of the service provided
- Proactive management of issues such as adaptation to climate change, mitigation of greenhouse gas emissions, and energy/materials/waste minimization in advance of government regulation on these issues (BC's regulation of carbon, new building energy codes, etc.)

- Public endorsement of a project through stakeholder engagement

It is recognized that individual APEGBC professionals cannot be expected to assume responsibility for incorporating sustainability in work or tasks beyond the scope of their authority. In areas within their scope of authority, however, APEGBC professionals are required to keep their knowledge current and seek appropriate expertise where required (see also Guideline 3, below).

■ GUIDELINE 2: INTEGRATE SUSTAINABILITY INTO PROFESSIONAL PRACTICE

Integrate sustainability considerations into professional practice, reflecting the APEGBC Code of Ethics' requirement to hold paramount the safety, health and welfare of the public, the protection of the environment and promoting health and safety within the workplace.

APEGBC professionals have an important responsibility to society. This responsibility is codified in the Code of Ethics, which APEGBC professionals must uphold. The Code of Ethics explicitly compels APEGBC professionals to hold paramount the safety, health and welfare of the public, and the protection of the environment, and to promote health and safety within the workplace. Specifically, the Code of Ethics states, in part, that APEGBC professionals shall:

“act at all times ... with fidelity to the public needs” (Preamble), and

“hold paramount the safety, health and welfare of the public, the protection of the environment...” (Section 14 (a) (1))

These provisions in the Code of Ethics implicitly require APEGBC professionals to have regard for sustainability in their practice, because of sustainability's inherent relationship to societal needs, the safety, health or welfare of the public, and the environment. Sustainable professional engineering and geoscience practice, as described in these Sustainability Guidelines, seeks to address these Code of Ethics responsibilities.

APEGBC professionals already have expertise in weighing economic and performance issues, such as cost and factors of safety. The application of these Sustainability Guidelines will help APEGBC professionals incorporate environmental and social issues in their practice.

Embodied in Guideline 2 is the consideration of the short and long-term, as well as direct and indirect impacts of APEGBC professional's designs and activities. It encourages APEGBC professionals to think outside traditional project boundaries and to consider the

greater impacts of their designs and projects. As we learn more about the way our world works – particularly, the way that humans and ecosystems interact – we learn more about what it takes to address the well-being of current and future generations and ecosystems. These ideas steer us away from thinking in terms of “trading-off” human welfare against ecosystem wellbeing.

There is almost always more than one way to perform a task. Evaluation of options should consider the full, life-cycle costs, from project conception to final decommissioning in order to fully understand the impacts of different alternatives. Evaluating potential designs of projects may require assessment of their resiliency or future adaptability to a range of potential future altered climate patterns. In reviewing a project’s full life cycle costs, the APEGBC professional needs to consider measures to mitigate climate change,

including but not limited to minimizing greenhouse gas emissions, while balancing economic, social and environmental factors. Many of the real costs of projects are commonly externalized and not considered as part of making a decision on a preferred alternative. It is important to try to consider the full costs and benefits of any proposed action.

In recommending specific options, APEGBC professionals should not limit their considerations to only technical issues. For each task, APEGBC professionals should consider other implications that are within their field of expertise. Known and reasonably foreseeable cumulative implications should also be considered. Finally, decisions for sustainability require a consideration of the consequences of not only the proposed action, but also its products and by-products, including their final disposal.

■ GUIDELINE 3: COLLABORATE WITH PEERS AND EXPERTS FROM CONCEPT TO COMPLETION

At key stages of the project life-cycle, collaborate with peers and experts across disciplines to identify appropriate alternatives and new opportunities for sustainable results.

The increasing complexity and innovation in providing sustainable solutions means that APEGBC professionals will

increasingly work in multi-disciplinary teams with team members having diverse knowledge and skills.

It is best to collaborate at the earliest stages, if possible, where opportunities for synergy between project components can more easily be explored to increase value and sustainability.

■ GUIDELINE 4: DEVELOP AND PRESENT CLEAR JUSTIFICATIONS TO IMPLEMENT SUSTAINABLE SOLUTIONS

Discuss opportunities and document decisions made related to the integration of environmental, social and economic metrics. These discussions should occur early enough to enable the client or employer to make informed decisions about how to implement an appropriate level of sustainability considerations in the task or projects, products, processes, or systems.

Through their widely varying professional activities, APEGBC professionals contribute to the form and function of our society: they are frequently decision-makers or in a position to influence decision-makers. As the advice given by APEGBC professionals can have far-reaching consequences, APEGBC professionals should explore solutions that promote a broad concept of sustainability – across environmental, social and economic domains.

In the course of an APEGBC professional's work, there are a number of stages where opportunities exist to investigate the social, environmental and economic impacts of potential solutions to a client's problem. APEGBC professionals should carefully weigh the impacts of alternatives and may provide a comparative analysis on their environmental, social and economic impacts.

The purpose of exploring alternatives is to encourage consideration of processes or options that best promote sustainability. This will have the greatest impact at the conceptual phase, where opportunities to apply best practices can be evaluated and clear justifications can encourage a client or employer to make an informed decision regarding sustainable solutions. APEGBC professionals are not obliged to assess all concepts, designs and methodologies,

only those that are deemed reasonable under the circumstances of the task. In determining what is “reasonable”, APEGBC professionals are expected to exercise professional judgment.

Guideline 4 highlights the APEGBC professionals' duty to exercise their professional judgment objectively and consistently. Honest differences of technical opinion among APEGBC professionals are to be anticipated because the matters involve professional judgment and are not subject to simple analysis. Open debate between APEGBC professionals is healthy and helpful to decision-makers. Care must be taken to provide independent professional guidance and analysis, the public will be best served if APEGBC professionals maintain objectivity.

With respect to documenting decisions made, APEGBC professionals should refer to APEGBC Bylaw 14(b), which addresses quality management processes for retaining project documentation. More information on retaining project documentation is available in the APEGBC Quality Management Guideline on Retention of Project Documentation, available on the APEGBC website.

While the APEGBC professional can present the opportunities and rationale for sustainable solutions, the decision on sustainable solutions remains with the client or employer.

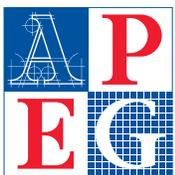
■ GUIDELINE 5: ASSESS SUSTAINABILITY PERFORMANCE AND IDENTIFY OPPORTUNITIES FOR IMPROVEMENT

Identify opportunities to improve knowledge and professional practice related to sustainability, where best practice is to assess actual performance of implemented solutions against the original design goals and metrics.

It is important to confirm whether designs are performing to expectations. That knowledge can be gained through both qualitative and quantitative data for the benefit of the profession and future developments. Where possible and reasonable, analysis of data should be used to improve or optimize future solutions.

The practice of professional engineering and geoscience continually improves due to technological advances, innovation and new design concepts. Assessing performance enables APEGBC professionals to identify opportunities for iterative improvements in designs, methods,

processes, and technology. This information contributes to the learning process and can be utilized by other APEGBC professionals to identify and enhance future solutions. APEGBC professionals should facilitate improvements and seek to proactively anticipate future needs for sustainability. These improvements should adopt a multi-disciplinary approach, consider risk based assessments and consider cumulative impacts, social values, economic requirements, and environmental aspects. As knowledge of sustainability evolves, existing codes, guidelines and standards may need to be updated. Actively working with others as leaders in the development of new best practices and legislation will enhance the public view of APEGBC professionals as ethical professionals who provide viable, valuable knowledge-based solutions.



Professional Engineers
and Geoscientists of BC

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