

# **Towards a Sustainability Management System for APEGBC**

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A blueprint for a SMS with an action plan

Prepared by the Sustainability Committee

of  
The Association of Professional Engineers  
And Geoscientists of B.C.

September 14, 2000

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## Introduction

Sustainability objectives are increasingly being adopted as central organising principles in major corporations, governments and other organizations both in BC and the world over. In essence, these principles seek to establish a dynamic balance between economic, environmental and social priorities, and to improve and maintain human and ecosystem well-being together, both now and into the long-term future, locally and globally. (See Appendix D.)

To date, the APEGBC Sustainability Committee has developed and implemented a number of initiatives supporting the Association's ongoing commitment and obligations with respect to sustainability. However, it has become clear that such an ad-hoc approach will be insufficient to establish sustainability as a real priority within the Association.

Following extensive consultation, including a stakeholder Charrette (workshop), APEGBC employee interviews and peer committee discussions, the Sustainability Committee is taking further its proposal to develop a Sustainability Management System (SMS) to help APEGBC adopt a more systematic approach to sustainability. A SMS will help mobilise the resources of APEGBC employees, committees and volunteer members towards the challenge of incorporating sustainability in each aspect of APEGBC's services.

The design of the SMS will be consistent with the principles of ISO 14001. The ISO 14000 series, from the International Organization for Standardisation, is an internationally recognized standard for environmental management systems that is based on voluntary initiatives for continual improvement. (See Appendix F. ) Modified for the APEGBC context, this proven standard provides a framework for the organization to improve sustainability performance within its financial, legal and political capacity. Certification to the ISO 14000 standard is not being considered at this time; this proposal is to achieve consistency with the management framework provided by the standard.

In an APEGBC SMS, many professional engineers and geoscientists throughout the Province will see similar initiatives in their own corporations mirrored or foreshadowed, enhancing the Association's image as an innovator in professional development, as well as significantly improving performance in its core activities.

This document describes a road map towards a Sustainability Management System for APEGBC.

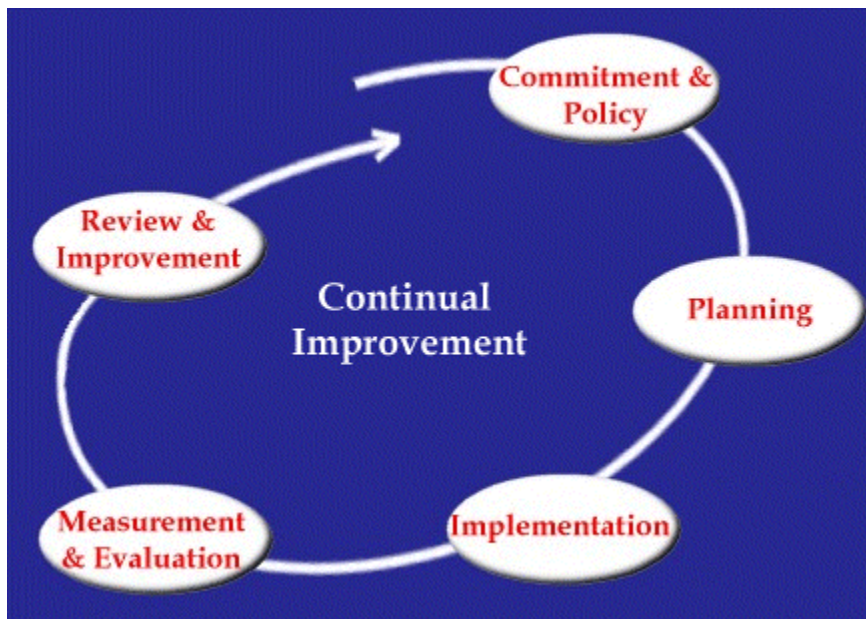
## Sustainability Management System (SMS)

A management system is simply a framework that provides order and consistency in organization methodologies.

Management systems can be particularly useful in helping organizations incorporate "big picture" issues such as quality control or business ethics into day-to-day practice.

The focus of an APEGBC SMS will be on integrating sustainability considerations into existing processes, structures and functions within the Association. It will provide for:

- Creation of a process for establishing and achieving targeted performance levels;
- Creation of a mechanism for assessing the success of programs and policies and translation of that insight into improved activities.



**Figure 1: ISO 14001 management model**

In creating the SMS, APEGBC will adopt an approach parallel to that developed by the International Standards Organization. This calls for the management system to undergo a continual improvement cycle comprising six elements, listed below and illustrated in Figure 1:

- setting goals and commitment, in which the organization states its intentions and commitment to sustainability performance;
- planning, in which the organization analyses the degree of sustainability in its operations;

- implementation and operation: the development and putting into practice of processes that will bring about sustainable goals and objectives;
- checking and corrective action: monitoring and measurement of sustainability indicators to ensure that goals and objectives are being met;
- management review: review of the SMS to ensure its continuing suitability, adequacy and effectiveness; and
- continual improvement - the cycle begins again
- commitment and policy: stating commitment to sustainability and its policy for the development of a culture for continual improvement;

Actions undertaken as part of the APEGBC SMS will be guided by the following principles:

- The Association will be encouraged to move systematically towards its long-term goals by taking initiatives that will provide benefits in the short-term, while retaining a longer-term perspective. The SMS will be a road map to achieve full sustainability. In the meantime, the SMS will look at the "low hanging fruit", with immediate benefits.
- With this move towards an APEGBC SMS, responsibility for implementing sustainability will increasingly shift to APEGBC as a whole, rather than existing as the separate focus of a single sub-committee.
- The approach will mobilise partnerships to leverage public and member support, enhance effectiveness and make the most of limited resources.
- The emphasis will be on skills and services where engineers and geoscientists in British Columbia could genuinely capitalise on professional or business opportunities.
- Initiatives will have measurable targets, tangible outcomes and require commitment from Council.
- There will be a heavy emphasis on enabling (education and information) and monitoring activities.

The SMS will recognise the scope of APEGBC's sphere of control and resources, but will look for opportunities to extend APEGBC influence via partnerships with others.

The Association will seek ways to communicate its commitments and actions with respect to sustainability to the public and other professional associations, as a means of increasing awareness and raising the profile of the Association as a driver of sustainability.

## Benefits, costs and other implications

### **Benefits**

Potential benefits of an APEGBC SMS include:

For the *Association*:

- Increased leadership role within society
- Operations that are:
  - More efficient and effective than at present;
  - More transparent, accountable, and responsive to the needs of both Members and society than at present;
  - More environmentally and socially responsible than at present;
- Improved communications within the Association and externally;
- Creation of a process for establishing and achieving targeted performance levels;
- Creation of a rigorous mechanism for assessing the success of APEGBC programs and policies and translation of that insight into improved subsequent activities
- An improved recruitment level in the profession
- An enhanced public image

For *Members*:

- An enhanced knowledge of bringing the ideas of sustainability and sustainable development from theory to practical application
- Access to a knowledge base at APEGBC in the form of information, tools, and management processes and programs that are available to assist in incorporating sustainability principles in their activities;
- Increased confidence in APEGBC
- Increased pride in their own profession and the role they play in society

### **Costs**

The SMS will incur some financial costs to realise the benefits. The cost of the program will be determined during the development of the SMS. One of the first actions of the strategic plan is the issue of funding and will look at sponsorship opportunities.

### **Other Implications**

The SMS will trigger a significant change in focus in the way that sustainability is approached within APEGBC. Until now, sustainability initiatives have been undertaken by the Sustainability Committee in relative isolation of the Association's other activities. The Actions outlined in

### Sustainability Guidelines

State that within the scope of a Member's task and work responsibility, each Member, exercising professional judgment, should:

1. Develop and maintain a level of understanding of the goals of, and issues related to, sustainability.
2. Take into account the individual and cumulative social, environmental and economic implications.
3. Take into account the short- and long-term consequences.
4. Take into account the direct and indirect consequences.
5. Assess reasonable alternative concepts, designs and/or methodologies.
6. Seek appropriate expertise in areas where the Member's knowledge is inadequate.
7. Cooperate with colleagues, clients, employers, decision-makers and the public in the pursuit of sustainability.

this document are aimed to fundamentally recast "sustainability culture" within the day-to-day reality of all APEGBC staff and committees, rather than simply being the focus of a single committee.

The SMS will make the bridge between the various groups related to the profession: Staff, Council, committees and volunteers, members in general, and outside stakeholders. The objective is to integrate. The SMS will not create any requirement for members to undertake their own SMS but instead will create the conditions for all groups to function better in relation to sustainability.

The impact of the SMS is expected to be the following:

#### *For Members:*

For the foreseeable future, Members, either as individuals or organizations, will involve themselves in sustainability activities on a voluntary basis. However, they will be exposed to sustainability through their contact with the Association and, increasingly, through other corporations and organizations that are adopting sustainability principles. Members will also benefit from the increased range of information and education resources that will become available to them.

#### *For committees:*

A review of the current management system in APEGBC has raised a number of procedural issues to help committees reconsider the ways in which they communicate and coordinate their activities.

Committees will be also encouraged to apply the Sustainability Guidelines (see box opposite) to evaluate how their actions and processes might have implications for the overall sustainability of APEGBC. There are two dimensions to this:

- sustainability in terms of the substantive function of the committee. For example, in the case of the Continuing Professional Development committee, how sustainability is incorporated into its training programs.
- sustainability in terms of the operation details of the committee. Continuing the same example, asking whether, for example, internet-based distance learning programs might be appropriate in certain cases from a systemic economic, environmental and social perspective.

For example, a workshop attended by a representative from each committee will be arranged to help work through the practical implications of this from all perspectives. Also, a member of the sustainability committee has been appointed to the Strategic Plan 2000 task force with the objective of better integrating sustainability in APEGBC's new five-year plan.

#### *For Staff:*

With the SMS, staff will take part in a number of reviews into how sustainability principles could be incorporated into the Association in terms of its everyday business. In promoting sustainable objectives, the SMS

also will help staff track resources more effectively, ensure better co-ordination and communication among activities, and help APEGBC demonstrate its effectiveness and accountability.

*For other stakeholders:*

The APEGBC will forge new partnerships with like-minded organizations with complementary skills searching to improve communications and co-ordination of activities.

## **Impact on APEGBC Current operations**

As in many small organizations, many elements of APEGBC's activities currently take place on an informal basis (for example, communications, and the handling of legal issues). Other activities, such as those pertaining to the processing of member applications, are formalised. The SMS will look at existing the management system and structure, and identify opportunities where changes to systems or structure could improve the organisation's ability to plan, implement, track and review its sustainability performance.

Appendix E presents an example of how a SMS will change the way that sustainability principles are incorporated into the Association's business.

APEGBC is undoubtedly a complex organisation, with over 1000 volunteers, 15,000 members, and many committees covering a wide range of professional issues. However, with only 27 employees and relatively modest financial resources, APEGBC does not need a comprehensive management system of a type found in large corporations. The Sustainability Committee's aim will be to develop a SMS that will:

- enhance the quality of management operations, communications and decisions;
- highlight unsustainable practices on a continuous basis;
- evaluate the sustainability implications of new activities;
- make sustainability considerations part of the way APEGBC does business.
- provide tools and procedures for educated, prompt decision-making, to make the sustainable analysis as brief and conclusive as possible.
- avoid any unnecessary or unreasonable changes to current practices;

## **Mission, Goals and Objectives of an SMS for APEGBC**

### ***Mission***

The SMS exists to incorporate sustainability principles into APEGBC and thereby to assist APEGBC in meeting its legal and ethical obligations to sustainability.

## **Goals**

The SMS will act as a framework for incorporating sustainability principles into APEGBC's mission, vision, strategic plan, operations, functions, communications and partnerships.

The SMS will provide an example to Members and so will lead the adoption of sustainability principles throughout BC.

## **Objectives**

The SMS will ensure that:

- APEGBC's commitments to sustainability continue to be relevant and adequate;
- all APEGBC employees understand sustainability concepts and their relevance to their work;
- APEGBC conducts initiatives that help to improve the adoption of sustainability practices among Members;
- the SMS will establish a process of systematic consultation and feedback with respect to sustainability;
- sustainability principles are fully integrated in all functions of the Association;
- sustainability benchmarks and indicators are widely accepted and used within APEGBC;
- APEGBC's action plans with respect to sustainability continue to meet needs perceived by Members and external stakeholders.

**Table 1: Overview of activities contributing towards a SMS for APEGBC**

Phase	Objectives	Activities	Done to date	Action Plan
Commitment and Policy Setting	Wide acceptance of Sustainability within APEGBC staff, committees and members.	Define and tangibly commit to a sustainability policy that can be documented, implemented and maintained. This should take into consideration the Association's mandate and philosophy. It should be signed by the Association staff and council and communicated to all members.	Commitment to sustainability principles. Guidelines for sustainability. Creation of sustainability committee to advance the cause of sustainability. Sustainability is part of APEG code of ethics.	Strategic Plan (1.1)
Planning	Establish a process of systematic consultation and feedback	Establish a systemic procedure to identify the sustainability aspect of the profession, to evaluate its impact and use this information to set objectives. This includes having a comprehensive look at the organisation, consulting stakeholders, establishing objectives, analysing the gaps (between "What is" and "What should be").	Extensive consultation with members and external stakeholders, (the Charrette) Staff interviews, Presentation to peer committees, including executive committee and council.	Renewal (6.1) Integration (1.2) Forum (4.4) Partnership (4.3)
Implementation	Mastering by all APEGBC employees of sustainability concepts. Full integration in all functions of the Association Raising awareness of sustainability in Members and supporting others' efforts to implement sustainability Enabling the SMS.	Define roles and responsibilities, and ensure adequate resources to implement, control, and maintain the system. It includes: <ul style="list-style-type: none"> <li>• Training and awareness for increased competence and knowledge.</li> <li>• Communication for transparency and accountability</li> <li>• Alignment and integration with existing structure and operations</li> </ul>	Identification of toolkits (Sustainability grid) Preparing a special issue of Innovation (July/August 99) Launching the sustainability web site Approaching other professional organizations with a view to learn about learn and pool professional development initiatives related to sustainability.	Primer (3.1) Technology Briefs (3.2) Award (3.3) Continuing Educ. (3.4) Communication Plan (4.1) Web (4.2) Funding (2.1) External Sourcing (2.2)
Measurement and Evaluation	Benchmark and indicators widely accepted and used	Establish key indicators, measure and report progress against the gaps, objectives and targets established during the planning phase.	Investigating practical ways to incorporate the sustainability guidelines into the practice review process	E/GIT Requirements (1.3) Licensing Req. (1.4.) Practice Guidelines (1.5) Practice Review (1.6) Performance Criteria (5.1) External Assessment (5.2)
Review and Improvement	Ensure sustainability action plans continue to meet needs perceived by Members and external stakeholders.	Take corrective actions, reviewing the management system and evaluating the general performance against the policy.		Renewal Process (6.1) AGM (6.2)

## Action Plan

### Preamble

The Actions below comprise initiatives that may be undertaken by APEGBC as it works to meet the objectives of the SMS. Subsequent revisions to this document will incorporate anticipated future amendments.

### Strategies and Actions

The Sustainability Committee has identified a number of strategies that are required at present to respond to feedback from stakeholders about weaknesses or gaps in the performance of APEGBC or its Members with respect to sustainability.

The Actions associated with these strategies will also contribute significantly towards the ultimate development of a SMS for APEGBC.

Note that since the following strategies and actions have been developed in response to *current* weaknesses and gaps, future Sustainability Action Plans should be expected to have significantly different priorities. These should not be confused with the Goals and Objectives of the SMS itself above.

**Table 2: Summary of Strategies and Actions**

Strategy 1	Improve integration of Sustainability in APEGBC operations and standards
<i>Rationale</i>	<i>One of APEGBC's fundamental strengths is its legislated role as the gatekeeper and regulator of professional activities in engineering and geoscience in BC. APEGBC can leverage this strength.</i>
Action 1.1	Include sustainability in the new five-year <b>Strategic Plan</b> .
Action 1.2	Improve <b>Integration</b> of sustainability in APEGBC operations by reviewing its management systems and by developing a way to integrate Sustainability into management and committee functions. This action will include a workshop for APEG staff and committee chairs (see 6.1)
Action 1.3	Review <b>EIT / GIT Requirements</b> by looking at how accreditation can include reference to sustainability.
Action 1.4	Examine <b>Licensing Requirements</b> by investigating alternatives for integrating sustainability knowledge or skills into license maintenance requirements.
Action 1.5	Review existing <b>Practice Guidelines</b> to ensure they incorporate sustainability considerations.
Action 1.6	Include Sustainability Guidelines in <b>Practice Review</b> .
Strategy 2	Enable the SMS
<i>Rationale</i>	<i>Developing the SMS will cost time and money. Members implementing sustainability will face economic barriers, such as increased cost or client opposition. .</i>
Action 2.1	Seek an internal <b>Funding</b> mechanism, internally within APEGBC or externally via partnership and sponsorship.
Action 2.2	Seek an <b>External Sourcing</b> mechanism such as corporate sponsorship or tax shift.



## Timeline

The action plan has a total of 20 actions organised over a period of 2 years and divided in four semesters. It has 2 milestones corresponding to the AGM for reporting back to Council and members of the progress of the plan. The chart in Table 3 indicates the period where the activities start, not the total period of the activity, which will continue over some period of time with the help of other committees. Linked actions (e.g. integration / workshop or funding / sponsorship) may start together. This way, 4 new activities are initiated every semester for the next 2 years.

### Semester 1: Legacy and start-up

In the first semester, the “legacy activities” will carry on and be expanded, such as the work on the strategic plan (1.1), the partnership (4.3) with the architects, technologists and Science World, and the web site (4.2).

A critical first step is the development of a plan to integrate sustainability into existing committee functions. (1.2). It will include a workshop (6.1) attended by representatives of all APEGBC committees in which the details of integrating sustainability into committee activities will be explored. This action will also incorporate the findings of an investigation into current management activities within APEGBC, and will develop ways of exploring alternative operational practices with the Association's employees.

Another important step is the search of internal funding and external sponsorship. (2.1.) and (2.2)

### Semester 2: Awareness and outreach

The second semester will focus on increasing understanding and accessibility of the sustainability principles, tools, and methodologies with the conception of a sustainability primer (3.1) and technology briefs. (3.2)

AGM 2001 will highlight sustainability with the first sustainability award (3.3), a sustainability forum (4.4) and the development of a feedback mechanism by council. (6.2).

### Semester 3: Communication and assessment

At the beginning of the second year, starts the development of a communication plan (4.2) and continuous education program (4.1) in collaboration with the communication committee.

The ISO 14000 system depends strongly on monitoring and tracking to ensure that improvement continues to occur. It is important to identify the indicators of performance by which the Association wishes to be

measured, and to establish a system of measuring these indicators on a regular basis. *(5.1)* and *(5.2)*

**Semester 4:**  
**Standards and operations.**

Finally the actions regarding standards and operations unique to are addressed. These are EIT/GIT requirements *(1.3)*, licensing requirements *(1.4)*, Practice guidelines *(1.5)* and practice review *(1.6)*

**Table 3 : Action Plan**

ID	Task Name	2001					2002				2003		
		Qtr 4	Qtr 1	Qtr 2	Qtr 3	Qtr 4	Qtr 1	Qtr 2	Qtr 3	Qtr 4	Qtr 1	Qtr 2	Qtr 3
1	AGM 2000	◆											
2	<b>Sem 1</b>	▶	▶	▶	▶	▶							
3	1.1. Strategic Plan	▶	▶	▶	▶	▶							
4	1.2. Operation integration	▶	▶	▶	▶	▶							
5	6.1. Stakeholder workshop	▶	▶	▶	▶	▶							
6	2.1. Funding	▶	▶	▶	▶	▶							
7	2.2. Sponsorship	▶	▶	▶	▶	▶							
8	4.2. Website	▶	▶	▶	▶	▶							
9	4.3. professional partnerships	▶	▶	▶	▶	▶							
10	<b>Sem 2</b>		▶	▶	▶	▶							
11	3.1. Sustainability Primer		▶	▶	▶	▶							
12	3.2. Technology Briefs		▶	▶	▶	▶							
13	3.3. Sustainability Award		▶	▶	▶	▶							
14	6.2. AGM Report		▶	▶	▶	▶							
15	4.4. Sustainability Forum		▶	▶	▶	▶							
16	AGM 2001						◆						
17	<b>Sem 3</b>						▶	▶	▶	▶			
18	3.4. Continuing Education Program						▶	▶	▶	▶			
19	4.1. Communication strategy						▶	▶	▶	▶			
20	5.2. External assessment						▶	▶	▶	▶			
21	5.1. Internal monitoring plan						▶	▶	▶	▶			
22	<b>Sem 4</b>							▶	▶	▶	▶		
23	1.4. Licensing Requirements							▶	▶	▶	▶		
24	1.5. Practice Guidelines							▶	▶	▶	▶		
25	1.3. Review EIT/GIT Requirements							▶	▶	▶	▶		
26	1.6. Practice Review							▶	▶	▶	▶		
27	AGM 2002											◆	

# APPENDICES

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## Appendix A: Sustainability Committee Steps Towards an SMS

Phase Date	Description	Status
<b>Initial Consultation / Outreach</b>		
Initiation Since '99	Sustainability Committee initiates idea, generates short discussion note to be used for engaging stakeholders within APEGBC, and begins early design work on the SMS to provide a starting point for others	Draft road map towards an SMS prepared.
Publication July 99	" <i>Sustainability and You</i> ". Special issue of the Innovation magazine on Sustainability describing the principles, some case studies and the idea of developing an SMS.	Many articles from members were proposed. Feedback regarding the issue was very positive.
Presentation at the AGM Oct, 23, 99	Presentation of ISO 14000 and the SMS concept to members and council at the AGM to obtain their initial reaction and critique.	Much encouragement received to proceed.
Consulting Practice Committee Nov 10, 99	Presentation of the SMS proposal to the Consulting Practice Committee and clarification of objectives and implications	Resolution passed by the CP committee that: <i>"The Consulting Practice Committee supports the adoption of the ISO 14000 series of Guidelines for environmental Management Systems to the Professional practice Committee with a view of eventually adopting ISO 14001 for regulation by APEGBC in the future."</i>
Professional Practice Committee Nov, 29, 99	Presentation of the SMS proposal to the P & P Committee and clarification of objectives and implications	Resolution passed by the P&P committee that: <i>By motion, the professional Practice Committee accepted the concept of the ISO 14000 series of Guidelines for Environmental Management Systems with a view to recommending to council the adoption of ISO 14001 registration for APEGBC, once an impact statement has been prepared by the sustainability committee to accompany/justify this proposal to council</i>
Presentation to CCPE Dec, 5, 99	Presentation of the sustainability committee initiatives to the CCPE environment committee.	CCPE decided to use APEGBC example for initiating sustainability policy

<b>Design of the SMS Blueprint</b>		
Charrette Feb 7, 00	Workshop attended by internal (members, association executives and staff) and external stakeholders (e.g. people affected by engineering services). The objective was to review APEGBC's current sustainability mandate and policy, to assess the ability of the Association and members to address sustainability issues, to identify gaps or perceived gaps in performance and to list opportunities and potential initiatives.	25 enthusiastic attendees provided more than 200 issues to solve, and 130 potential actions that were subsequently used by the Sustainability Committee to list the main gaps in the performance of the members and the Association, produce a SWOT analysis, and identify action plan items to address the gaps.
Staff Interview May 15, 00	Presentation to APEGBC staff to obtain their reaction, feedback and support to the initiative.	Interview report prepared and a summary incorporated in the SMS blueprint.
Executive committee June 27, 00	First presentation of the SMS plan to the Executive committee to obtain their support and feedback	Favourable feedback from the committee.
Council July 12, 00	First presentation of the SMS plan to the Council to obtain their support and feedback	Favourable feedback from the committee.
<b>Approval</b>		
Sustainability Committee Aug.16, 00	Final discussion at the sustainability Committee.	SMS approved by the Sustainability committee
Executive committee Aug. 29, 00	Second presentation of the SMS blueprint to the Executive for approval	The executive committee endorsed the document and recommended it to be presented to council for approval.
Council Sept. 13 2000	Presentation, complete with scope, resources, work plan, and timeline, to Council for approval.	APEGBC Council approved unanimously the document and the action plan.

## Appendix B: Relevant Existing Obligations of APEGBC Towards Sustainability

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### ***Engineers and Geoscientists Act***

Section 10 enables the Association to create Bylaws, of which number 14 is a Code of Ethics.

### ***Code of Ethics***

14 (a) 1 requires that engineers and geoscientists "hold paramount the safety, health and welfare of the public, the protection of the environment and promote health and safety within the workplace"; the Association has explicitly interpreted this as an obligation to abide by or apply the Sustainability Guidelines.

### ***The Iron Ring Ceremony***

Exists to: "remind the young graduates of the obligations they are accepting upon entry into the hallowed halls of professional practice"

### ***Sustainability Guidelines***

State that within the scope of a Member's task and work responsibility, each Member, exercising professional judgement, should:

1. Develop and maintain a level of understanding of the goals of, and issues related to, sustainability.
2. Take into account the individual and cumulative social, environmental and economic implications.
3. Take into account the short- and long-term consequences.
4. Take into account the direct and indirect consequences.
5. Assess reasonable alternative concepts, designs and/or methodologies.
6. Seek appropriate expertise in areas where the Member's knowledge is inadequate.
7. Cooperate with colleagues, clients, employers, decision-makers and the public in the pursuit of sustainability.

### ***Strategic Plan Mission Statement***

APEGBC's Mission is: "To forge a cohesive, able and articulate membership to lead in the protection of public safety, health and well-being, the creation of value through engineering and geoscience and the promotion and achievement of sustainability."

In addition to being mentioned explicitly, sustainability is a superb opportunity for engineers and geoscientists to add value to their activities. Sustainability considerations carry with them a range of skills and abilities that will be increasingly sought after in the working environment.

### ***Strategic Plan, Goal 7***

Goal 7 of the 1995-2000 Strategic Plan states that APEGBC will "demonstrate leadership in promoting and achieving sustainability"; To this end, it will endorse and encourage the use of the Sustainability Guidelines, monitor and respond to key issues related to sustainability and promote Member awareness of sustainability and related issues.

### ***Guidelines for Excellence***

In its "Guidelines for Excellence", APEGBC also alludes to sustainability in several instances, including:

"...Members should not ... sign or seal plans... that, in their professional opinion, would...have significant adverse effects on the environment...."

## Appendix C: Charrette Results

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### ***What needs to be improved?***

In February, 2000, APEGBC held a charrette (workshop) with internal (Members, Association executives and staff) and external stakeholders (e.g., people who receive or are affected by engineering/geoscience services). The objectives of the charrette were to:

- Review APEGBC's current mandate and policy with respect to sustainability
- Identify key issues (gaps or perceived gaps in the performance of the professions with respect to sustainability and the performance of the Association, key barriers, etc.)
- Identify opportunities and specific initiatives that APEGBC should consider

From that charrette, the following performance gaps were identified. They are not necessarily the views of the Sustainability Committee, but represent a range of widely held opinions volunteered during the workshop and in subsequent interviews with APEGBC employees, Members and stakeholders.

### ***Gaps in Members' performance***

These are the gaps in the performance of Members that APEGBC will proactively try to address via its SMS:

#### Communication Skills

- Engineers and geoscientists are typically poor at communicating complex technical information to the public and engaging them in meaningful dialogue/decision making. Engineer to engineer communication is also weak, creating technical silos. In an environment in which project "process" is assuming a greater importance, and in which clearly articulating technical perspectives in multidisciplinary discussions will be increasingly critical, improving the communication skills of its Members is a key priority for the Association.

#### Social Considerations in Engineering/Geoscience Practice

- Engineers and geoscientists typically have limited understanding (or interest) in the social implications of their work. Therefore, they are overlooking essential design and operation objectives, or under-emphasising them when evaluating design alternatives.

## Interdisciplinary and Systems Thinking

- Engineers and geoscientists often do not see the “big picture” of the projects they are working on. By limiting themselves to the technical aspects of projects, many are in danger of becoming mere technicians.
- In contrast to members of the medical and legal professions, who interact with the public and other professions daily, engineers and geoscientists often work in isolation. This isolation can act as a barrier to the engineers’ and geoscientists’ awareness of changes in public attitudes towards particular issues.
- Engineers’ and geoscientists’ training and practice are traditionally bound by narrow disciplinary expertise and rivalries. The new millennium requires more systemic and holistic approaches to solving problems. Unfortunately, the nature of our training and practice limits our ability to effectively address modern problems.
- Engineers and geoscientists are typically overconfident about their areas of expertise. There are many reasons for this, several previously mentioned, including lack of awareness of unintended consequences of their actions, lack of understanding of others’ abilities, lack of appreciation of changing social priorities, a poor appreciation of the uncertainty and complexity involved in others’ analyses and institutional insularity.

## Multi-Objective Decision Making / Poor Reporting of Sustainability Considerations

- In performing project evaluations, engineers and geoscientists typically overemphasise economic benefits;
- Engineers and geoscientists often do not give adequate consideration to softer social/Sustainability impacts;
- Engineers and geoscientists lack influence in early project development phases;
- Engineers and geoscientists typically have a poor understanding of natural mechanisms, particularly ecosystems;
- Engineers and geoscientists often give inadequate consideration to longer time horizons, cross-boundary effects and multiple stakeholders;
- Engineers and geoscientists will often value short-term capital costs over long term operational savings. More sophisticated financial analyses of projects may help them justify other financial considerations (e.g. option valuations) to financiers.

Lack of understanding of the role/responsibilities of engineers with respect to Sustainability

- Engineers and geoscientists are uncertain about their responsibilities with regard to sustainability,
- Many Members have little or no awareness of sustainability
- Engineers and geoscientists often do not see how sustainability is related to their discipline (e.g. structural engineers)

### ***Gaps in APEGBC's performance***

These are the gaps in the performance of the Association that APEG will try to address through its SMS.

Lack of integration of sustainability into APEGBC's systems/standards

- Sustainability is currently a marginal concern within APEGBC.

Lack of monitoring and measures of sustainability

- APEGBC does not track many important aspects of member activities relating to sustainability, such as how many or which Members are implementing the Sustainability Guidelines and how.
- APEGBC has no concrete guidelines (or benchmarks) to give Members about when they are meeting sustainability requirements;
- Professional practice guidelines focus on the traditional design role and do not consider the sustainability guidelines;
- Existing standards need to consider longer time horizons

Lack of leadership with respect to sustainability

- APEGBC is not playing a leadership role in promoting sustainability with public policy makers and clients
- APEGBC has not defined well the role of engineers in sustainability.
- APEGBC is not proactive in telling its Members and the public of its commitment to sustainability

### ***APEGBC SWOT analysis***

Strategically, organisations seek to affect change by leveraging their strengths, taking advantage of the opportunities open to them, avoiding

or seeking help with their weaknesses and preparing to counter threats facing them.

It is important therefore to examine APEGBC's strengths, weaknesses, opportunities and threats (SWOT) in the light of sustainability:

## Strengths

Employees, Members and stakeholders agree that APEGBC has a plethora of strengths as a sustainability-promoting organisation. It already has a policy and commitment to sustainability, has implemented diverse initiatives related to sustainability and has the commitment of the Sustainability Committee and Council to the concept of sustainability. In addition, the Association has an existing code of ethics and other guidelines for excellence that may found the basis for integrating sustainability principles.

APEGBC has the structure and processes to self-regulate within the scope of the Engineers and Geoscientists Act, a revision of which APEGBC may be able to influence. Its more than 18,000 Members are well-educated professionals with broad experience and backgrounds. APEGBC has a public perception of seriousness and technical competence.

## Weaknesses

In common with many organisations, APEGBC has weak planning, objective-setting and monitoring capabilities with respect to sustainability. There has been no demonstrated progress in increasing awareness of sustainability in the Membership, and most Members still identify with a traditional and limiting definition of engineering.

## Opportunities

Distinct markets are emerging for sustainable (green) engineering, and so APEGBC's sustainability activities may lead to competitive advantages for its Members. Other Members have expressed interest in receiving sustainability-related services from APEGBC. There is a possibility to integrate sustainability into existing APEGBC initiatives and mandates, such as through the EIT/GIT training program and examinations, accreditation and professional practice activities (investigation of complaints, practice reviews, professional development, research task force, disciplinary activities etc.).

The Association has the potential to influence BC University curricula, and to form partnerships with other organisations or professions that are active in sustainability. There is considerable opportunity to gain influence by promoting sustainable solutions, technologies and approaches that already exist and that can be applied in both the private and public sectors.

## Threats / Challenges / Constraints

APEGBC has limited funding and limited opportunity for fee increases. Its fee structure is not adapted to the extra-work that would be required in incorporating sustainability principles. Currently, there is a limited understanding of the need for sustainability among Members, and we can expect limited active support for the Association to assume a leading role in promoting its principles. There is no appetite for a “stick” approach to rectify this situation, and there are no clear standards to enforce.

The SWOT analysis reveals a number of important features to consider when developing an SMS Action Plan. There is clearly a need to take advantage of APEGBC's existing commitment to public welfare through its ability to influence the actions of those around it, including legislators, Members and partner organisations. One of the main challenges will be to progressively achieve this within the "comfort zone" of Members and with the limited personnel and financial resources available.

The Actions listed in "SMS Action Plan" are developed directly from this analysis.

## Appendix D: Sustainability and Engineering

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### ***What is Sustainability?***

Sustainability simply refers to the long-term viability of an activity, system, or series of interdependent systems.

One comprehensive definition of sustainability is found in Paul Hawken's book, *The Ecology of Commerce*:

*Sustainability is an economic state where the demands placed upon the environment by people and commerce can be met without reducing the capacity of the environment to provide for future generations. It can also be expressed in the simple terms of an economic golden rule for the restorative economy: leave the world better than you found it, take no more than you need, try not to harm life of the environment, make amends if you do.*

For at least fifteen years, there has been growing global concern about the sustainability of the essential systems that enable modern societies to function, including our interdependent economic, social and environmental systems.

Perhaps the biggest issue of our time is to find ways of living well and developing successfully that do not compromise the ability of future generations to do the same.

Not surprisingly, opinions on what sustainability means and how to achieve it vary enormously. Nevertheless, there is an emerging consensus on certain "principles" of sustainable human development.

These principles do not confine us to living in bell jars. Nor do they necessarily require top-down government edicts.

The principles primarily refer to finding ways of gradually cutting back on material and energy use, reducing waste emissions, easing social inequities and involving the public meaningfully in the tough choices that need to be made to achieve these changes. Sustainability is about increasing quality of life for all, now, and into the future.

### ***Is it mainstream?***

Momentum has now gathered to the point where governments and corporations throughout the world recognise sustainability as an increasingly important priority.

The United Nations, OECD, the World Bank, the Asian Development Bank, the European Union amongst many others have adopted principles of sustainability to guide policy development and decision-making. One hundred and thirty of the world's largest and most successful corporations from 35 countries representing more than 20 major industrial sectors are now joined in the World Business Council on Sustainable Development.

In Canada, every federal department is now required by law to create a Sustainability Strategy; progress is audited on a three-year cycle by the Commissioner of Environment and Sustainable Development, an officer located in the Auditor General of Canada's office.

Here in British Columbia, companies such as Westcoast Energy, BC Hydro, Placer Dome, Canada Forest Products and Weyerhaeuser have integrated sustainability ideas in their corporate business plans or are in the process of doing so. At the municipal level, the Greater Vancouver Regional District, the Capital Regional District, and a number of cities including Vancouver, Victoria, Richmond and Nanaimo have all adopted sustainability as a key policy element.

### ***Why should engineers and geoscientists care about sustainability?***

Sustainability is a key component of the responsibility engineers and geoscientists assume as professionals.

However, sustainability also offers engineering and geoscience companies and individuals alike several major opportunities, including:

- to raise the profile and enhance the image of the professions by taking responsibility, showing leadership and demonstrating innovation;
- to add value and marketability to engineering and geoscience by increasing their range of skills and becoming more actively involved with issues of strategic importance;
- to boost the flagging morale of engineers and geoscientists by being part of a movement that leads, rather than reacts to, public opinion;
- increases the credibility of Members' claims to be acting in the public interest

### ***What does applying the concept of sustainability mean for engineers and geoscientists?***

Many engineers and geoscientists have already seen their roles change as sustainability-related issues begin to percolate through society. For many years, we have routinely incorporated financial and environmental considerations into our everyday work. More recently perhaps, most have noticed an increased focus on social priorities in our projects. This is the mundane and frequently unwelcome manifestation of the often-lofty issues sustainability raises.

As much as Members may prefer to "specialise" on the "technical" aspects of engineering or sustainability, this is not an option for a professional engineer or geoscientist. Sustainability considerations are not just

central design criteria, but oblige us to back up and ask whether a particular problem would benefit from a technical solution at all.

An important feature of sustainability, therefore, is that it is a value-based concept. There is no optimum formula, but many potential paths: the choice of what is to be valued and to what degree, can vary between individuals, groups, and cultures. As a result, agreement must be negotiated. For this reason, the "process" side of applying the ideas of sustainability is as critical as the "substantive" or "technical" side. Developing these skills will become as critical to the success of an engineer or geoscientist as the ability to use a computer.

Application of the ideas of sustainability can bring to light important considerations that have not traditionally been factored into technical solutions. However, applying these ideas also demands a full and fair accounting of the positive implications – to people and ecosystems – of any given human activity whether it be mining, fishing, manufacturing chemicals, generating and distributing energy, building structures, making compost, or disposing hazardous waste. For the engineer and geoscientist, it provides the opportunity to clearly articulate (and within the profession, debate) their contribution to society and the surrounding world.

## Appendix E: The SMS in Practice

As an example of how the SMS would work, let's take a typical example of an Action Item from this plan: Action 3.2: Development of Sustainable Technology Briefs.

In summary, the purpose of this Action is to provide Members with regular updates (perhaps through an automatic email list server) on technology breakthroughs or advances.

The following table summarises how this initiative would have been undertaken without and with an SMS.

**Table E1: With and Without an SMS: An example**

Phase	Without SMS	With SMS	New Links
Commitment	The technology briefs may have limited credibility if perceived as initiating from "sustainability people" rather than the result of APEGBC systemic commitment	The technology briefs will carry the credibility of APEGBC and be referred to APEGBC commitment.	Strategic plan,
Planning	Sustainability Committee acts alone to research, develop, promote and distribute the technology briefs	Sustainability Committee acts in collaboration with other committees.	Professional Practice, etc,
Implementation (Resources)	This work would depend on a dedicated idea "champion" to make sure things happened. The idea lives or dies with this individual.	The Action is built into the system of services APEGBC provides to Members. It is not dependent on one individual.	Regional committees
Implementation (Communication)	The technology Brief created by the Sustainability Committee may conflict with the messages coming from other committees, such as the Professional Practise Committee. Special channels ("special" issue of Innovation must be used to publish the brief).	As a more self-aware organization, APEGBC will send consistent messages. The message can use existing channels.	Communication committee, Innovation
Monitoring	The effectiveness of producing the technology briefs would be unknown.	The effectiveness of the technology briefs will be monitored in various ways, such as number of list-serve subscribers, annual survey of services etc.	Practice review committee

In short, rather than acting alone, the Sustainability Committee will begin to support other committees and staff in *their* provision of more sustainable activities.

## Appendix F: Drawing from ISO

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ISO has three major series that are relevant to the SMS initiative. The ISO 9000 series addresses the achievement of Total Quality Management, the ISO 14000 series addresses environmental protection and sustainable development and includes standards for the development of an effective Environmental Management System, and ISO 18000 deals with Social Responsibility, Health, and Safety. The three series were developed sequentially over time (ISO 18000, the most recent, was released in April, 2000). They are integrated and build on each other.

Some companies and organizations have chosen to seek formal ISO certification for a variety of reasons, including the potential for improved decision-making, improved access to financing and improved relationships with stakeholders (particularly the public). However others have chosen to learn from the ISO approach and adapt the system to their own needs, never seeking certification. ISO certification is not currently being considered, although in the future, APEGBC may find this a useful course of action.

Here follows a brief overview of ISO 14000 from the ISO standard.

### ***Introduction***

Following on the heels of the ISO 9000 standards for quality management, the ISO 14000 standards hold out the promise to revolutionise environmental protection as we have known it in the past quarter century.

These standards embody a novel approach that relies on changes in organizational commitments, focus, and behaviour rather than on coercion from government authorities. They are expected to provide the basis and the key to actualise strategic environmental management in organizations and redirect regulatory evolution to what is variously referred to as the “new paradigm,” the “dual track,” or the “co-operative model.”

If we look back, for comparison, at the existing ‘command-and-control’ regime, we see that it did not fail in fostering actions that led to improvement of the environment. In fact, the environment has improved rather noticeably since 1970, the year our modern environmental movement began. Rivers no longer burn and air is much cleaner. Many toxins such as PCBs, phosphates, and lead have, for the most part, been removed from the environment.

Whether any other approach could have worked in 1970 or for much of the two decades that followed is a subject much debated. Some argue, that a voluntary, co-operative approach would not have worked in a world that, by today’s standards, was lax in its environmental attitudes and convinced of its belief that environmental protection and economic development are antithetical. It was necessary, they would claim, to have imposed extremely detailed rules and technological prescriptions with sanctions and threats of punishment. No one questions the value of our environmental gains since 1970. Rather, what is questioned is whether

we went too far with the prescriptions, the threats, the costs, and the resulting climate of distrust, litigation, and ideological skirmishes. Perhaps the more relevant questions today are whether we can build on what we have achieved to promote further progress in environmental protection, and what is the best model to follow under prevailing conditions?

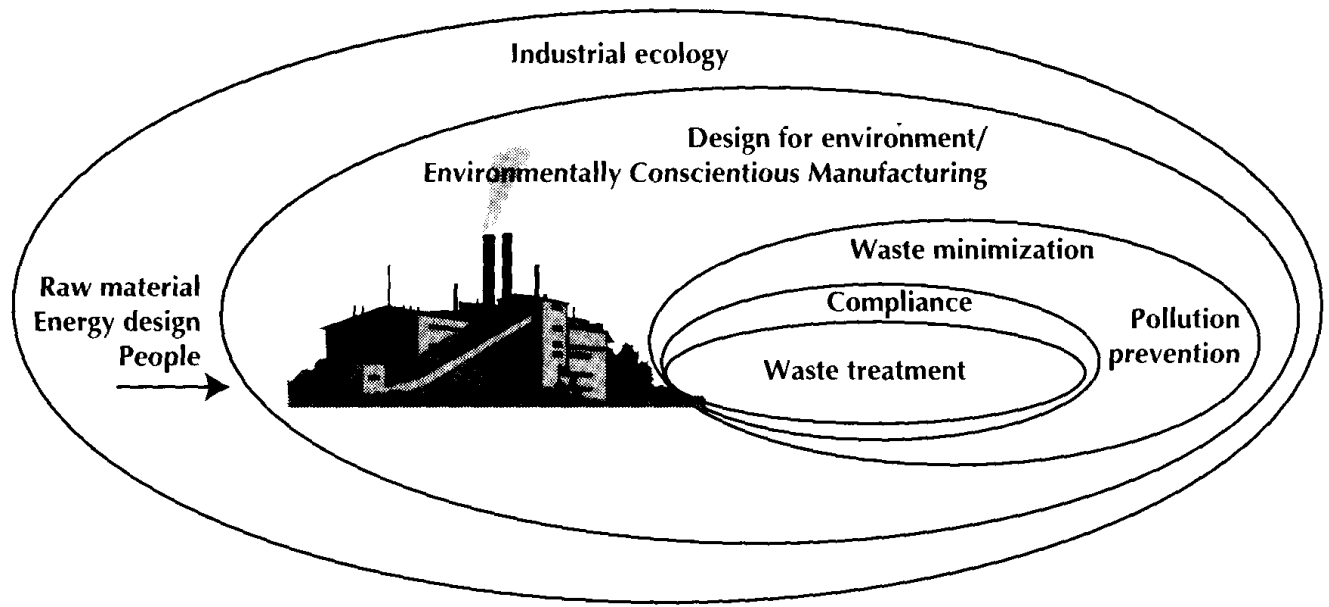
We should first ask, “What are today’s prevailing conditions?” We can certainly start with the general and very popular desire to reduce government and bureaucracy. Some of this is already happening, and any reading of the tea leaves points to diminishing resources and capability for all regulatory agencies.

For example, the U.S. Environmental Protection Agency’s (EPA) ability to send out legions of inspectors and auditors to operating facilities continues to erode as funds are slashed. Furthermore, the job of the remaining inspectors has become ever more difficult and not just because of reduced funding. As the obvious sources of pollution were addressed by organizations, the ability of government inspectors to ascertain the more subtle threats to the environment became less certain. Much of the potential environmental improvement that can still be tapped is tied to improvements in the industrial processes themselves and not to the control of wastes after they have left those processes.

Government agencies world-wide, including the U.S. EPA, have acknowledged this reality by their growing focus on pollution prevention rather than pollution control. But success in this area is dependent on voluntary initiative by organizations. The U.S. EPA, for example, has neither the resources nor the competence to dictate to industry how industrial processes should be designed. Unless we employ an approach that stimulates voluntary action, we are not likely to see significant improvement in these processes.

Another factor adding to the momentum for change is the unacceptably low returns of the current approach. For example, the yearly tab for environmental protection in the United States is somewhere between \$120 and \$140 billion. While these expenditures have led to improvements, there is wide recognition that much of this sum is squandered on litigation, bureaucracies, paperwork, inspections, and unnecessary procedures.

Most of these expenditures mushroomed from the very approach that relied on detailed technical commands from government agencies, followed by close supervision, enforcement, and punishment of all infractions both substantive and administrative. Not surprisingly, command-and-control methods spawned a huge body of legal experts as organizations sought protection from what was often perceived as overzealous idealism, or worse, ideologues. It can be argued that this was the only approach feasible during the 1970s and 1980s. There is now, however, a great desire to cut waste so that we can reap greater returns from investments.



Fortunately, major advances in the acceptance of an environmental ethic within industry have made pursuit of cutting waste realistic and achievable. The compatibility of environmental protection and economic development is no longer seriously questioned. What is even more heartening is the growing realisation that technological development that cuts down on pollution often results in greater profitability and competitiveness.

The recent popularity of voluntary environmental programs with both industry and government attests to the force behind these drivers for change. Examples of early versions of such programs include the Coalition for Environmentally Responsible Economies (CERES) principles and the International Chamber of Commerce *Business Charter for Sustainable Development Principles of Environmental Management*. The U.S. EPA later came out with Green Lights, Energy Star, and many others. The Chemical Manufacturers Association adopted the Responsible Care® program, and other industry groups followed with their own versions of that approach. More recently, the U.S. EPA has proposed other pilot programs that seek higher environmental performance for various regulatory advantages such as the Environmental Leadership Program, the Common Sense Initiative, and Project XL.

The ISO 14000 series of standards builds on these programs in a number of significant ways.

- First, it provides the framework through a series of specified elements that takes the guesswork out of integrating strategic environmental management into company operations.
- Second, it is universally expected that implementation will be verified through third-party audits to verify the good-faith endeavours.
- Finally, the universality of ISO 14000 - created by consensus of delegates from nearly 50 countries over a five-year period - sets the

ISO 14000 standards far above any of the existing programs. That universality augurs well for the acceptance of ISO 14000 internationally, and all indications today are that the standards are being accepted very quickly on a broad front. The great expectation is that ISO 14000 will become the engine for fostering an environmental ethic within organizations.

The ramifications of such change are potentially vast as individuals begin to export their environmental sensitivity from their workplace to their homes and families. ISO 14000 has the promise to drive societies to realize the much desired but elusive goal of sustainable development. It will foster the development of clean technologies, greater environmental protection, and, for those with a bottom-line orientation, greater competitiveness.

## **What Is ISO?**

The International Organization for Standardisation (ISO) is a world-wide federation founded in 1947 to promote the development of international manufacturing, trade, and communication standards. ISO is composed of national standards bodies from 118 countries. The Standards Council of Canada (SCS) is the Canadian representative to ISO.

ISO's stated goal is "to promote the development of standardisation and related activities in the world with a view to facilitating the international exchange of goods and services and to developing co-operation in the sphere of intellectual, scientific, technological, and economic activity."

Until late 1970, ISO's work was largely technical in nature. It focused almost exclusively on product specifications and guidance geared toward performance attributes. But with the advent of ISO Technical Committee 176 on quality management and quality assurance in 1979, it began focusing attention on holistic business management systems that take into account horizontal functions and decision making.

In adding horizontal and process-oriented standards to its mix of vertical and product-oriented standards, ISO is reflecting a shift in thinking by business leaders. Today, these leaders are integrating and co-ordinating their operations to face stiff and sometimes unpredictable global competition. And many governments are seeking to boost national interests by fostering incentives for this kind of thinking.

Before developing a standard, ISO receives input from government, industry, and other interested parties. More than 70 percent of ISO members are governments or quasi-governments. Many offer input through a consensus process that seeks to include a broad array of interested parties, including manufacturing, consumer, laboratory testing, engineering, academic, and environmental organizations. Other standards organizations are more closed in their deliberations.

1. All standards developed by ISO are voluntary. However, countries and industries often adopt ISO standards as requirements for doing business. ISO develops standards in all industries except those related to electrical and electronic engineering. Stan-

dards in these areas are developed by the Geneva-based International Electrotechnical Commission (IEC), which has more than 52 member countries, including the United States. There are three levels of ISO membership:

A **full member** of ISO is the national body “most representative of standardisation in its member country.” Full members sit on the ISO General Assembly and are candidates for ISO Council membership. The Council governs ISO operations and consists of the principal officers and 18 elected member bodies. The Council also appoints the Treasurer, the 12 members of the Technical Management Board, and the Chairs of the policy development committees. It also decides on the annual budget of the Central Secretariat. Full members can participate and vote in any ISO technical committee.

A **correspondent member** is usually an organization in a developing country that does not yet have its own national standards body. Correspondent members do not take active part in standards development, but are kept up-to-date about work of interest to them.

A **subscriber member** is a country with a very small economy that pays reduced membership dues, allowing it to maintain contact with international standardisation activities.

As of early 1996, ISO had assigned standards and other document development to 213 technical committees (TCs). Generally, related documents are assigned to one technical committee. The ISO 14000 series of environmental management system standards has been assigned to TC 207.

## ***What Is an EMS?***

An environmental management system (EMS) is that facet of your organisation’s overall management structure that addresses the immediate and long-term impact of your company’s products, services, and processes on the environment. An EMS provides order and consistency in organisation methodologies by allocating resources, assigning responsibilities, and continually evaluating the organisation’s practices, procedures, and processes.

An EMS is essential to an organization’s ability to anticipate and meet growing environmental performance expectations and to ensure ongoing compliance with national and international requirements. EMSs succeed best when corporations make environmental management among their highest priorities.

Generally, environmental management systems should provide organizations with the framework to do the following:

- establish an appropriate environmental policy, including a commitment to prevention of pollution;
- determine the legislative requirements and environmental aspects associated with the organisation’s activities, products, and services;

- develop management and employee commitment to the protection of the environment, with clear assignment of accountability and responsibility;
- encourage environmental planning throughout the full range of the organisation's activities, from raw material acquisition through product distribution;
- establish a disciplined management process for achieving targeted performance levels;
- provide appropriate and sufficient resources, including training, to achieve targeted performance levels on an ongoing basis;
- establish and maintain an emergency preparedness and response program;
- establish a system of operational control and maintenance of the program to ensure continuing high levels of system performance;
- evaluate environmental performance against the policy, objectives, and targets, and seek improvement where appropriate;
- establish a management process to review and audit the EMS and to identify opportunities for improvement of the system and resulting environmental performance;
- establish and maintain appropriate communications with internal and external interested parties; and
- encourage contractors and suppliers to establish an EMS. ISO 14001 can provide this framework.

### ***What Is Driving the EMS Movement?***

Public concern over the impact of industrial products and processes on the world's environment is increasing. Politically oriented bodies such as environmental advocacy organisations, watchdog groups, and the "green" parties that have established footholds in most European parliaments are urging businesses to take responsibility for their environmental effects. This pressure from the public sector has led to a rash of proposed and enacted environmental legislation world-wide.

However, recent reports are showing that companies choose to implement an EMS more for internal management system efficiencies, waste reduction, and proactive regulatory compliance than for any other purpose. The list of reasons many companies are now adopting an environmental management system includes the following:

- Ease of trade -International standards obviate the need for and proliferation of national and regional standards that are more likely to hinder trade by erecting barriers and bureaucratic complexity and redundancies.
- Improved compliance with legislative and regulatory requirements - This includes requirements that certain information relating to environmental performance be made public.

- Credibility -Third-party certification ensures the credibility and substance of a commitment to regulatory compliance and continuous, institutional focus on environmental protection.
- Reduction in liability/risk.
- Regulatory incentives - organizations can take advantage of incentives that reward companies showing environmental leadership through certified compliance with an EMS.
- Sentencing mitigation -It is likely that sentencing guidelines will accept corporate EMSs as mitigating factors in levying both individual and corporate fines.
- Pollution prevention and waste reduction and attendant savings and expense reduction.
- Profit –Customers such as consumers and governments are increasingly preferring to purchase “green” products.
- Improved internal management methods -and the efficiencies and savings that result.
- Pressure from shareholder groups who are more likely than ever to look for environmental responsibility in investments and financial reports.
- Pressure from environmentalists who bring a raft of legal precedents to bear on companies they consider poor environmental players  
Community goodwill.
- A high-quality workforce, which is seeking empowerment and involvement along with healthy and safe working conditions.
- Insurance companies are less willing to issue coverage for pollution incidents unless the firm requesting coverage has a proven environmental management system in place.
- Sustainable development Management standards will become a stepping-stone for less developed countries (LDCs) to begin their progress toward an equivalent level of environmental protection found in their more developed neighbours. Since management standards require considerably fewer resources to implement, LDCs can reap the benefits of more focused and organised environmental protection activities now. Over time, as their economies grow in concert with environmental protections, they can acquire appropriate technologies to maximise environmental protection.
- Preference in bank loans - Some institutions, such as the World Bank, may view ISO 14000 as a test of a country’s sincerity in its promotion of environmental protection and sustainable development.

## Appendix G: Detailed Action Plan

<b>Strategy 1: Improve integration of Sustainability in APEGBC systems/standards</b>	
<p>One of APEGBC's fundamental strengths is its legislated role as the gatekeeper and regulator of professional activities in engineering and geoscience in BC. APEGBC can leverage this strength to raise the standard of professional engineering and geoscience with respect to sustainability, and thereby demonstrate its legal and ethical responsibility to uphold the welfare and safety of the public.</p>	
<b>Action 1.1 Include sustainability in the new five-year strategic plan</b>	
<b>Description</b>	<p>APEGBC is currently preparing the new five-year strategic plan. ( 2000-2005) The former plan (1995-2000) already contains the principle of sustainability.</p> <p>A member of the sustainability committee currently participate to the strategic plan task force in order to insure sustainability principles and this SMS are accounted for.</p>
<b>Rationale</b>	Participate in the new five-year strategic plan to insure sustainability principles and this SMS are accounted for.
<b>Performance Measure</b>	Principles of sustainability included in the new Strategic plan.
<b>Action 1.2 Review APEG Management Systems and Develop a Work Plan for Integrating Sustainability into Management and Committee Functions</b>	
<b>Description</b>	<p>APEGBC has recently completed research into its Management Systems, and is currently assessing its findings to develop a series of proposals aimed at increasing its sustainability performance.</p> <p>This Work Plan represents the first stage in determining suitable avenues by which sustainability could ultimately be fully integrated into the APEGBC management system.</p> <p>A key feature of this Action will be to organise a Workshop in which representatives from all APEGBC committees work through the practical implications of applying the Sustainability Guidelines.</p>
<b>Rationale</b>	The Association's sustainability commitments are currently met through the actions of the Sustainability Committee acting in isolation. This action is designed to ensure that accountability for sustainability is shared among all staff and committees and to ensure that activities among committees are neither redundant nor contradictory.
<b>Performance Measure</b>	<p>% individual systems that have been assessed for sustainability or quality features.</p> <p>% of APEGBC managers who have co-developed / adopted amended systems</p>
<b>Action 1.3. Review EIT / GIT Requirements</b>	
<b>Description</b>	APEGBC will conduct a review into how the requirements for EIT / GIT accreditation can and/or could include reference to sustainability principles. This review process must involve the participation of an interdisciplinary committee on which the sustainability committee is represented. The main deliverable of this review will include a set of recommendations about how sustainability could be integrated into EIT/GIT training requirements.
<b>Rationale</b>	EIT / GIT training considerations must balance today's practical realities of professional practise with a balanced understanding of the growing importance of sustainability. The suitability of EIT / GIT accreditation procedures have been questioned in other contexts. Young engineers and geoscientists particularly have much to gain from an early appreciation of sustainability issues, a performance gap highlighted by the charrette.
<b>Performance Measure</b>	% EIT / GIT training modules that incorporate sustainability principles Level of retention of knowledge after training, assessed by delayed follow-up feedback form.
<b>Action 1.4 Examine Licensing Requirements</b>	
<b>Description</b>	This action is to <b>investigate</b> (not at this stage to implement) alternatives for integrating

	<p>sustainability knowledge or skills into license maintenance requirements.</p> <p>The deliverable of the study would include an options paper with a qualitative cost/benefit analysis of each specific proposal.</p>
<b>Rationale</b>	License maintenance requirements have been the subject of consideration for reasons unrelated to sustainability. A multi-perspective review of these requirements may therefore be a timely activity to ensure that license maintenance requirements are relevant and serve all stakeholders' needs.
<b>Performance Measure</b>	<p>% licensing requirements deemed relevant by stakeholders</p> <p>Extent to which licensing requirements promotes sustainability</p> <p>Yes/No measure: Have sustainability requirements been articulated explicitly in the license requirements?</p>
<b>Action 1.5.</b>	<b>Practice Guidelines</b>
<b>Description</b>	APEGBC will review existing practice guidelines to ensure they incorporate sustainability considerations. A system will also be established to ensure that sustainability considerations are properly considered in future guidelines issued by the Association
<b>Rationale</b>	All APEGBC Guidelines are "intended to establish minimum standards of practice which Members must meet to fulfil the Member's professional obligations, especially in regard to the primary duty to protect the public." The specific appearance of sustainability in each of these guidelines will do much to improve their performance in this regard.
<b>Performance Measure</b>	<p>System for new guidelines implemented?: Yes / No</p> <p>% existing guidelines reviewed</p>
<b>Action 1.6</b>	<b>Include Sustainability Guidelines in Practice Review</b>
<b>Description</b>	Members will be required to demonstrate that they have consulted the Sustainability Guidelines in their projects. Intended as an evolutionary process, Members will initially be asked to consider questions that probe their awareness and application of the Guidelines, with clear indication that this is for awareness building only. Eventually, more onus may be placed on Members to show that the Guidelines have been reasonably considered, and that changes in practice have resulted. In the medium to long term (i.e. >five years), remedial action may be recommended as an outcome of a practice review.
<b>Rationale</b>	<p>This action would address the need for improving sustainability performance monitoring capability, a high priority requirement of an ISO-style management system. It would be a major way of integrating sustainability principles into the Association's business and ensuring accountability for its sustainability commitments.</p> <p>Time requirements would be modest, especially given the new format for Practice Review, which would simply require Members to indicate how they are applying the Guidelines. As the emphasis is initially just awareness building and information sharing, this represents an opportunity for Members to see that APEGBC takes the Guidelines seriously, and to learn about resources available from APEGBC.</p>
<b>Performance Measure</b>	<p>Required?: Yes / No</p> <p>% Members who demonstrate they have referred to the Sustainability Guidelines</p> <p>Quality of application of the Guidelines, assessed against listed indicators.</p>

<b>Strategy 2: Enable the SMS</b>	
Development and implementation of the SMS will require resources in time and money. This strategy aims at finding these resources whether internally within APEGBC, or externally from sponsors.	
<b>Action 2.1 Internal Sourcing</b>	
<b>Description</b>	Seek Internal Sourcing within APEGBC and its members.
<b>Rationale</b>	The implementation of the SMS will bring numerous benefits to APEGBC such as improved operations or recruitment level, therefore the Association should have a budget for supporting some of the cost of developing the SMS. The budget should include some soft cost such as Staff time or use of existing infrastructure (Communication, web,...)
<b>Performance Measure</b>	% of SMS budget covered by APEGBC, services offered by APEGBC, number of members volunteering.
<b>Action 2.2 External Sourcing</b>	
<b>Description</b>	<u>Seek External Sourcing from</u> other organisations, corporations, external sponsors, or governmental organisations.
<b>Rationale</b>	The SMS will ultimately help many organisations and governmental agencies in their goal to achieve sustainability. These organisations could be approached for financial or technical help. Federal, Provincial and municipal government could be approached in the context of pollution prevention or the new green economy
<b>Resources</b>	% of SMS budget covered by sponsorship or services offered by external organisations or agencies.

<b>Strategy 3: Increase sustainability awareness and training for staff, committees, and members</b>	
The lack of awareness of sustainability both within APEGBC and its Members is a key barrier to its implementation. APEGBC's prime objective continues to be to rectify this.	
<b>Action 3.1 Sustainability primer</b>	
<b>Description</b>	APEGBC will develop an information package about sustainability that will act as a primer. As Members encounter sustainability through other avenues mentioned below, the information package will provide context and background information. <i>A critical component of the primer will be to make the "rational self-interest" case for sustainability to otherwise disinterested Members and/or Member companies.</i> Making a convincing case is critical to the success of this overall project, as sustainability will not sell on an ethical basis alone.
<b>Rationale</b>	A simple, readily accessible resource on sustainability for engineers and geoscientists is a natural initial step in raising awareness. The Internet will be an ideal vehicle for this.
<b>Performance Measure</b>	% Members with a working knowledge of Sustainability Principles, estimated from web survey (Action 4.1) % Members who have downloaded the primer from the website % Members who have attended a PD workshop
<b>Action 3.2 Technology Briefs</b>	
<b>Description</b>	APEGBC will develop and issue a two-page briefing note describing newly commercialising technologies that may contribute social or environmental benefits. The note will indicate that APEGBC encourages Members to "familiarise themselves" with this technology or method.  Issued biannually, primary responsibility for developing the Briefs will rotate among APEGBC, AIBC and (Tech Assoc). Subject technologies will be identified in partnership with the professional practice committee, as will development of the Briefing Note itself. Release will be subject to PPC approval.  Each Briefing Note will be issued with a press release, flexibly timed to coincide with other news on related new technologies. The Briefing Note will be advertised in Innovations and posted on the APEGBC website, possibly through an automated "listserve" email distribution.
<b>Rationale</b>	This proposal builds on Members' capacity for and interest in technology and innovation. It leverages existing resources (website, Innovation), and will provide high profile news/marketing exposure for at least some newsworthy (local?) technologies (e.g., recent article on flyash in Vancouver Sun).  By targeting engineers in highly technical fields that often have difficulty understanding their potential role in promoting sustainability, this Action will have a major impact on the ground. This Action will also enhance the level of relevant contact between the Association and its Members, potentially boosting support for the Association.  APEGBC could seek partners to finance this – i.e., BCH Energy Futures for alternative energy briefs, etc.
<b>Performance Measure</b>	Implemented?: Yes / No Number of webpage hits or listserver subscribers % of Members who have applied this information in their everyday work, or number of high profile projects that were inspired. Periodic surveys

<b>Action 3.3 Sustainability Awards</b>	
<b>Description</b>	APEGBC is currently giving all kind of awards, including the environmental award. This award will extend the environmental award o the concept of sustainability. Developing a sustainable award will require to develop criteria and guidelines for assessing projects.
<b>Rationale</b>	An Award is extremely effective way to increase awareness and foster emulation.
<b>Performance Measure</b>	Number of companies, individual applying to the ward, prestige of the award.
<b>Action 3.4 Continuing Education Program</b>	
<b>Description</b>	<p>A continuing education program will be designed to address Members' performance gaps. Conducted in collaboration with other professional associations e.g, architects, BCWWA, etc, the program will have the further benefit of aligning sustainability perspectives of the various professional groups. This program could be combined with other educational needs, such as those related to Guidelines for Excellence.</p> <p>APEGBC should seek corporate sponsorship for this initiative, which will initially be on a voluntary basis, but could, depending on member support, ultimately be part of a license maintenance requirement.</p>
<b>Rationale</b>	This program can be designed to specifically address the high priority performance gaps identified in the charrette. By developing the program on a fee or sponsorship basis, demands on existing APEGBC resources will be minimised.
<b>Performance Measure</b>	<p>% Members with a working knowledge of Sustainability Principles, estimated from web survey (Action 4.1)</p> <p>% Members who have attended a PD workshop</p>

### Strategy 4: Improve Communication and collaboration on Sustainability practices and standards.

Communication has been identified as one of the key areas in which APEGBC and its members must improve its performance with respect to sustainability (See Appendix).

Engineers and geoscientists the world over have a traditional problem in getting their message across, both to the general public and to other professional groups. Through this Action, the first steps will be taken to improve the way APEGBC deals with and uses the media to convey its activities regarding sustainability. Although some care must be extended in approaching this (See Appendix, part b), better communications could be the key to re-establishing the strong image of the professions.

This Action Item seeks to address this issue, and also to find ways of integrating the efforts of like-minded professional groups towards establishing combined sustainable practices and initiatives.

#### Action 4.1 Develop a communication strategy

**Description** There are many ways in which APEGBC could develop more effective communications with respect to sustainability. For example, it could sponsor high profile (low cost) events with media potential in partnership with AIBC, ENGOs etc. It could also find opportunities for press releases and low cost sponsorship of events, and develop a strategy for effective use of Innovations, branch newsletters, articles in other professional newsletters, etc. APEGBC could develop a more active media relations contact to respond to media enquiries about general professional issues or events. Such a contact should be well-versed in sustainability issues so that the subject can be raised and referred to where appropriate.

**Rationale** The media could represent an opportunity to convey APEGBC's professional and sustainable practices, in partnership with other organizations.

**Performance Measure** Implemented?: Yes / No  
Association of sustainability with APEGBC in the public opinion.

#### Action 4.2. Web Site

**Description** Develop an interactive web site to inform members and external parties and receive feedback

**Rationale** Today, the web is a mandatory component of any serious communication strategy. part of today

**Performance Measure** Number of visitors to the site. Number of feedback received.

#### Action 4.3 Develop active professional partnerships

**Description** APEGBC will investigate and cultivate professional partnerships relating to sustainability both in BC (eg with AIBC, etc) and beyond.

**Rationale** APEGBC does not exist in isolation. Many like-minded professional organizations in BC and further afield are similarly grappling with sustainability issues, and much could be gained from activity attempting to develop common approaches and pool resources.

The Internet gives APEGBC a whole new avenue for exploring these possibilities. For example, the UK's Institution of Chemical Engineers has gained considerable experience with its [www.sustainability2000.org](http://www.sustainability2000.org) initiative, which brings corporations, governments and academics together to discuss sustainability issues. Prime Minister Tony Blair formally launched the website last year.

**Performance Measure** Implemented?: Yes / No  
Association of sustainability with APEGBC in the public opinion.

Action 4.4	Sustainability Forum
<b>Description</b>	As a relatively new consideration in professional practice, most genuine efforts to integrate sustainability principles into everyday work represent the state of the art. To ensure efforts are not to be unnecessarily duplicated and that the most is to be made of our combined new experience, APEGBC will facilitate a professional forum to exchange ideas amongst practitioners and the curious. The forum may make use of the APEGBC website, or take the form of community or professional meetings or workshops, the outcomes of which made available to those unable to attend.
<b>Rationale</b>	Mirroring the needs of the early Professional Associations, sustainable engineers and geoscientists genuinely need a place to gather, virtual or otherwise, to exchange "war stories" and practical tips and information on the day-to-day realities of sustainability. This will increase the effectiveness of engineer to engineer communication, and may serve to interest the public and other professionals in APEGBC's activities.
<b>Performance Measure</b>	Implemented?: Yes / No Number of webpage hits, meetings Level of debate, quality of information exchange, existence of other forums

## Strategy 5: Develop system of internal and external monitoring

The ISO philosophy of continual improvement requires that all significant actions, systems or programs be monitored and, where possible, quantitatively tracked to ensure that progress towards goals and objectives are being made. It is important to distinguish between monitoring APEGBC and monitoring Members. The “targets” APEGBC sets for itself are “auditable” standards. We do not set targets in this Action Plan. However, we anticipate that subsequent work plans will set targets. APEGBC should self-audit to these targets to assess its performance.

In the future, if ISO certification is pursued, certified auditors would assess performance relative to the things over which APEGBC has control, such as the number of courses offered to Members. APEGBC cannot control the actual practices of Members. The monitoring plan is therefore two-fold:

- To monitor how well APEGBC is doing with respect to its commitments to implement the Action Plan. This provides feedback on how well the plan is being implemented.
- To monitor (longer term) how member awareness and/or practices are changing. APEGBC has no control over this, and should not be audited to it. However, this information provides important information about whether the Action Plan is effective at achieving APEGBC’s ultimate objectives – to enhance sustainability practices in the professions. The information from this member monitoring plan will be used to revise subsequent action plans to ensure long term effectiveness and accountability to APEGBC’s sustainability objectives.

An important aspect of a future Sustainability Management System will therefore require that systems are in place to evaluate baseline conditions and to track the performance of initiatives on a regular basis.

Action 5.1 Develop Internal (APEGBC) Performance Criteria and Monitoring Plan	
<b>Description</b>	As mentioned elsewhere in this document, APEGBC has recently completed research into the nature of its existing management system. From this review, and working with APEGBC’s employees, the Association will develop a number of practical indicators by which the progress of the organization towards enhancing sustainability can be measured.  Once viable indicators have been agreed upon, a review will establish the current levels of these indicators, and, where possible, these will be compared to similar organizations that have undergone a similar exercise. Periodically, each indicator will be studied to ensure its continued suitability and value.
<b>Rationale</b>	As explored in Appendix F, the use of performance indicators is a fundamental component of the ISO management system.
<b>Performance Measure</b>	Implemented?: Yes / No Measures to be developed alongside employees.
Action 5.2 Develop External Monitoring Plan	
<b>Description</b>	A system of monitoring Members’ performance with respect to sustainability will comprise a number of components. One important feature will be a Member survey, which may piggyback the existing tri-annual member salary survey, or may take the form on an on-going online questionnaire posted to the APEGBC website.  An external monitoring system will also include the activities of actual or potential partner professional groups, including AIBC etc.
<b>Rationale</b>	The use of performance indicators is a fundamental component of the ISO management system.
<b>Performance Measure</b>	Implemented?: Yes / No Measures to be developed alongside employees.

## Strategy 6: Continual Improvement and Renewal

An important part of the ISO-style continuous improvement cycle is the need to periodically take stock of the current position and re-evaluate the meaning of the indicator values, the suitability of policy goals and commitments, etc.

### Action 6.1 Bi-annual Stakeholder Workshop and Plan Renewal

**Description** In a bi-annual stakeholder workshop, APEGBC will step back from the day-to-day considerations of sustainability to contemplate how well its system is functioning. Are its goals and commitments still appropriate? How should current indicator values be interpreted? How are the various programs performing? Which one should be extended, and which ones cut? The workshop will focus on the systems to which APEGBC as an organization could, in principle, be audited to.

**Rationale** The review process is a critical feature of an ISO-style management system. External stakeholders are essential participants in this process, to ensure that the Association's goals and objectives mirror those of the society they serve.

**Performance Measure** Implemented?: Yes / No

### Action 6.2 AGM Report

**Description** APEGBC will report its annual achievements in furthering sustainability each year at the AGM.

**Rationale** The AGM is an ideal opportunity to reach a variety of stakeholders to inform them of sustainable achievements to date.

**Performance Measure** Implemented?: Yes / No

## Appendix H: Sustainability Guidelines

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Within the scope of a Member's task and work responsibility each Member, exercising professional judgement, should:

- Develop and maintain a level of understanding of sustainability goals and issues.
- Take into account the individual and cumulative social, environmental and economic implications of her/his work.
- Take into account the short- and long-term consequences.
- Take into account the direct and indirect consequences.
- Assess reasonable alternative concepts, designs and/or methodologies.
- Seek appropriate expertise in areas where the Member's knowledge is inadequate.
- Co-operate with colleagues, clients, employers, decision-makers and the public in the pursuit of sustainability.

### ***Application of the Guidelines***

The Guidelines are advisory in nature and are intended to assist Members. Their use will help to clarify the desirability of proceeding with a Member's task.

The Guidelines are generally applicable to the practice of professional engineering and geoscience, but are not specific to any one discipline. Members are encouraged to develop checklists for their discipline-specific tasks.

Members must exercise professional judgement in adhering to the Guidelines and are not expected to apply them without qualification. It is not anticipated that a project or development will score 100% on all of the Guidelines.

While no sustainability goal should be infringed without clear justification, there will be times when compromise and balancing of competing interests is necessary. For example, there may be short-term economic costs in supporting communities or environmental conditions. Declining environmental conditions on a local level may be accepted until social or economic conditions improve in another case.