The EDGE

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Equity & Diversity in Geoscience & Engineering

Please don't hesitate to give your input...

Send submissions to the DAWEG Newsletter Editor

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in this issue...

Newsletter for the Division for Advancement of Women in Engineering & Geoscience

A Division of the Association of Professional Engineers & Geoscientists of British Columbia

Engineering for Sustainability – What's That!

By Maggie Wojtarowicz, Editor

1. *Did you know that the Association of Professional Engineers and Geoscientists of British Columbia is developing a Sustainability Management System?*
2. *Did you know that Engineering for Sustainability is your ethical obligation as a member of the Association?*
3. *Do you know what it means to Engineer for Sustainability?*

The first I didn't know anything about, I'm not surprised at the second, and only had a vague idea of the third until I attended the Sustainability Management System Workshop put on by APEGBC on March 8, 2001. I will share with you now a little of what I learned, and found very interesting and inspiring at the workshop, as well as what I found somewhat disconcerting.

Sustainability—what does it mean? and more importantly, what does it mean to the average engineer?

The APEGBC Guidelines for Sustainability define sustainability as *"a process or state that can be maintained indefinitely. Sustainability integrates a viable economy, protection of the environment and social well-being"*.

What this definition means in practice to the average engineer is that the everyday work of the engineer—be it design, implementation, operation, or decommissioning—should take into consideration not only the economic implications of the work, but also the environmental and social impacts. Whether the work is a design of a wastewater treatment plant, or construction of a bridge, or process design at a petroleum refinery, or implementation of a computer system, or development of a new home entertainment system, the engineer performing this work needs, at the very least, to be aware of its impact beyond the boundaries of the project at hand. Ideally, the engineer will have considered:

- the true reason or need for a project;
- the technical, economic, social and environmental impacts at each stage of the project (i.e., where the materials come from to make a "gadget"; how much energy will be required to build and operate the "gadget"; what will happen to the "gadget" at the end of its life);
- the beneficial and adverse effects of the project, their probability, duration and reversibility;
- the scale of the impact (i.e., having local or broader consequences);
- the costs, both direct and indirect, easily quantifiable and external; and
- the alternatives to the proposed project, comparing the effects of each.

[It should be noted that these considerations—typically referred to as the "whole-system engineering" approach—will most likely end up making the final product more economical in the long-run, if not also in the short-term.] Upon such consideration, the engineer is ethically bound by the *Code of Ethics* to act in the best interest of the needs of the public, holding "*paramount the safety, health and welfare of the public,* [and] *the protection of the environment…"*.

In essence, Engineering for Sustainability is nothing new: it follows from the *Code of Ethics* that has long been in existence. Where the added challenge presents itself is in becoming aware and acting accordingly with the changing values of society. Taking environmental responsibility as an example, society today has to contend with problems that only a generation or two before would not have imagined. Who knew that an open pit garbage dump would affect the drinking water supply three towns away, or that an engineered (lined) landfill would be contributing to global warming by the

release of methane? Who would have thought that hydroelectricity is not always pollution-neutral (large hydro dams that flood extensive areas of forested land affect the earth's ability to absorb the atmospheric carbon dioxide that is responsible for most of the present day's climate change)? Who considered the fact that 90% of the energy generated at a power plant can be lost to the atmosphere before the remaining 10% reaches the end use—an inefficient pump at an industrial site[1]—and that this is a problem which contributes to excessive melting of polar ice? Who would have expected that after over a hundred years of engineering only 20% of the energy in the fuel pumped into a typical automobile is utilized to move the automobile, and that only 1% of the energy in the fuel is used to move the driver (the remaining 80% of the energy is lost in the engine's heat and exhaust)[1], and that this inefficiency would cost billions of dollars in health care due to respiratory problems among other ailments.

These "new" environmental problems of today result in a shift in the priorities that society sets for itself—and for its engineers. Where the engineer of several decades ago was primarily concerned with efficient economics of a project and public safety, the engineer of today must also be concerned with public health and the future of this planet.

[1] ***Natural Capitalism***, Paul Hawken, Amory Lovins and L. Hunter Lovins (1999)

What is startling (and which was evident at the Workshop) is that the awareness of this shift in societal values among the leaders of society—the engineers—is quite limited, not to mention the acceptance of this "new" responsibility. Hence, APEGBC is and has been for a number of years working on a strategy and its implementation to include the principles of sustainability in the work of the Association and all of its members. To that end, the Association through its Sustainability Committee has developed a *Blueprint* for a Sustainability Management System which is to aid the Association adopt a systematic approach to sustainability. Thus, the purpose of the Workshop was to educate the member engineers about the principles of sustainability; to inform the members of the existence of the proposed Sustainability Management System; and to get feedback from the members on the acceptance of the direction in which APEGBC is heading as well as to provide input for making this process more practical for the members.

It is most worthwhile for all members to familiarize themselves with the entire contents of the *Blueprint*. The Sustainability Committee has also prepared a four page summary of the *Blueprint*, which contains the details of their Strategy and the current Action Plan for the Committee. For your information and convenience, a copy of the summary follows this editorial.

As members of DAWEG and as the Executive Committee of DAWEG, there is a number of actions we can undertake to assist the Sustainability Committee achieve the goals it has set out for the Association and the engineering community. As a start, we can contribute our efforts to some of the action items set out in the Committee's Action Plan (please refer to the insert that follows). Specifically, DAWEG members can:

- provide and express their support for the Committee's new five-year Strategic Plan and the Committee's initiatives;
- help integrate sustainability into DAWEG functions and activities;
- become familiar with and inform others of the Practice Guidelines on Sustainability;
- contribute to the development of information packages about sustainability; and
- support and recognize any proposed "Sustainability in Action" awards, and include sustainability criteria in awards presented elsewhere (i.e., at other associations, in the workplace).

Towards an APEGBC Sustainability Management System a blueprint for a SMS

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.

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 Sys-tem (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.

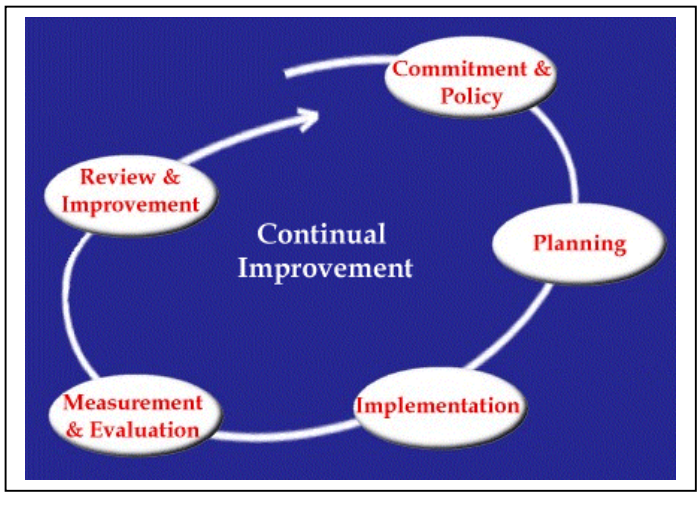
The design of the SMS will be consistent with the principles of ISO 14001. The ISO 14000 series, from the International Organization for Standardisation, is an internationally recognized standard for environmental management systems that is based on voluntary initiatives for continual improvement. Modified 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.

The SMS will allow many professional engineers and geoscientists throughout the Province to mirror similar initiatives in their own corporations, enhancing the Association's image as an innovator in professional development, as well as significantly improving performance in its core activities.

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.

ISO 14001 Model



SMS Overall Strategy

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 process Operation 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: • Training and awareness for increased competence and knowledge. • Communication for transparency and accountability • Alignment and integration with existing structure and operations	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 pooling 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)

Sustainability Committee Action Plan 2000-2002

Strategy 1	**Improve integration of Sustainability in APEGBC operations and standards**
Rationale	*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.*
Action 1.1	Include sustainability in the new five-year **Strategic Plan**.
Action 1.2	Improve **Integration** 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 key stakeholders, APEG staff and committee chairs (see 6.1)
Action 1.3	Review **EIT / GIT Requirements** by looking at how accreditation can include reference to sustainability.
Action 1.4	Examine **Licensing Requirements** by investigating alternatives for integrating sustainability knowledge or skills into license maintenance requirements.
Action 1.5	Review existing **Practice Guidelines** to ensure they incorporate sustainability considerations.
Action 1.6	Include Sustainability Guidelines in **Practice Review**.
Strategy 2	**Enable the SMS**
Rationale	*Developing the SMS will cost time and money. Members implementing sustainability will face economic barriers, such as increased cost or client opposition. .*
Action 2.1	Seek an internal **Funding** mechanism, internally within APEGBC or externally via partnership and sponsorship.
Action 2.2	Seek an **External Sourcing** mechanism such as corporate sponsorship or government grant.
Strategy 3	**Increase sustainability awareness and training for staff, committees, and members**
Rationale	*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.*
Action 3.1	Develop a **Sustainability Primer,** which will provide context and background and develop the "rational self-interest" case for sustainability to otherwise disinterested Members and Member companies
Action 3.2	Develop **Technology Briefs** describing new technologies or members' achievements in sustainability to promote innovation, show feasibility of sustainability concept, and create emulation. (This action could be part of Action 1.2)
Action 3.3	Create a "Sustainability in Action" **Award** extending the environmental award to the concept of sustainability. Developing a sustainable award will require to develop criteria and guidelines for assessing projects
Action 3.4	Design of a **Continuing Education** program to address Members' performance gaps.
Strategy 4	**Improve communication and collaboration on sustainability practices and standards**
Rationale	*Communication both internally and externally has been identified as one of the key areas in which APEGBC and its members must improve its performance with respect to sustainability.*
Action 4.1	Assist the Communications Committee to develop a **Communications Plan** with respect to sustainability
Action 4.2	Develop an interactive **Web** site to inform members and external stakeholders and receive feedback.
Action 4.3	Investigate and cultivate professional **Partnerships** relating to sustainability both in BC (e.g. with AIBC, ASTT, UBC, etc.) and beyond.
Action 4.4	Create a Sustainability **Forum** to prevent duplication of effort and exchange ideas amongst practitioners and stakeholders. (This action could be combined with 6.1)
Strategy 5:	**Develop system of internal and external monitoring**
Rationale	*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.*

Action 5.1	Develop an internal (APEGBC) **Performance Criteria** and Monitoring Plan by identifying a number of practical indicators by which the progress of the organization towards enhancing sustainability can be measured.
Action 5.2	Develop an **External Assessment** Plan, featuring a Member survey
Strategy 6:	**Continual improvement and renewal**
Rationale	*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	Establish a sustainability reporting and **Renewal** process by implementing a bi-annual stakeholder workshop and plan renewal. The first workshop will be linked to Action 1.2.
Action 6.2	Systematise reporting back to the **AGM**

SMS: Mission, Goals and Objectives

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 princi-ples 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.

The Next "Survivor" Show

Courtesy of "e-mail funnies"

Have you heard about the next "Survivor" show that is planned?

Mark Burnett, producer of "Survivor" plans to enlist 12 men, who will be dropped in an unidentified suburb with a van and six kids. Each child plays two sports and each takes music lessons or attends dance class.

They have no access to fast food. The children attend three schools with three different drop-off and pick-up times.

Contestants must keep the house clean, assist with all homework (receiving at least a "C+" on all papers), complete one science project, cook and do laundry. They have access to television only when the kids are asleep and all chores are done. None of the TV's have remotes.

The competitions will consist of such things as: PTA meetings; cleaning up after a sick child at 3:00 a.m; make a model Indian hut with six toothpicks, a tortilla and one marker; get a 4 year old to eat a serving of peas; take night classes; and arrange for trustworthy childcare.

They will be allowed to organize one night out for themselves but they must plan 2 weeks in advance and find a sitter. The kids get to vote them off at tribal council.

The winner gets to go back to his job.

We could learn a lot from crayons: some are sharp, some are pretty, some are dull, some have weird names, and all are different colors ... but they all have to learn to live in the same box.

Positions Advertisements

Applications are invited for two positions in the School of Engineering Science at Simon Fraser University.

PMC-Sierra Senior Chair in Communications

The PMC-Sierra Senior Chair in Communications is a tenured position at the Associate Professor or Professor level. The successful applicant will have an internationally recognised record of research in wireless communication at the link level, with contributions to fields such as smart antennae, modulation and coding. However, outstanding candidates in related areas will be considered.

Sierra Wireless Chair in Communications

The Sierra Wireless Chair in Communications is a tenure-track position at the Assistant Professor level. The successful applicant will have demonstrated outstanding promise for research through a strong initial record of publications and projects and have expertise in high-speed digital signal processing applied to wireless communications. Examples include DSP And VLSI implementation of transceiver architectures or source compression of multimedia signals for wireless. However, outstanding candidates in related areas will be considered.

Responsibilities of both positions include research and teaching. Support will be provided to the successful applicants for establishing their research programs. As well, they will be eligible for fellowships in the BC Advanced Systems Institute, which carry significant research funding.

The School of Engineering Science has 22 faculty members, with a flourishing graduate program of 75 full-time and 65 part-time students. Faculty members maintain strong links with the BC Advanced Systems Institute, many industrial partners and national and international colleagues.

Simon Fraser University serves about 18,000 students. The university has been ranked first in the comprehensive category several times in the last five years in a national ranking of Canadian Univeresities carried out by Macleans magazine. The university is situated on top of Burnaby Mountain just east of Vancouver and commands magnificent mountain and ocean views. The Lower Mainland area of British Columbia is unique in Canada for its mild climate and varied recreational opportunities.

In accordance with Canadian immigration requirements, priority will be given to Canadian citizens and permanent residents of Canada. The University is committed to employment equity and welcomes applications from all qualified women and men, including visible minorities, aboriginal people, persons with disabilities, gay men and lesbians. Applications will be accepted until the positions are filled; May 1 may be taken as a practical cut-off. For updated information, see http://www.ensc.sfu.ca

To apply, send a curriculum vitae, evidence of research productivity (including selected reprints) and the names, addresses and phone numbers of three referees to:

Dr John Jones, Director
School of Engineering Science
Simon Fraser University

8888 University Drive
Burnaby, BC
V5A 1S6
Canada

email: jones@sfu.ca

UPCOMING EVENTS…

ICWES12 Conference
"Women in a Knowledge-Based Society"

ICWES12 Conference
"Women in a Knowledge-Based Society"
(international conference of women engineers and scientists)
Saturday July 27 - Wednesday July 31, 2002

For more details visit
www.icwes12.org

Call for paper deadlines:

Paper and Panel Summaries: July 15,2001 (250-500 words)
Full Paper/Panel/Poster: Oct 1, 2001
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