

Sustainability Now

Newsletter of the Sustainability Initiative

of the Association of Professional Engineers and Geoscientists of B.C.



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Industrial Processes

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If not now, when? If not us, who?

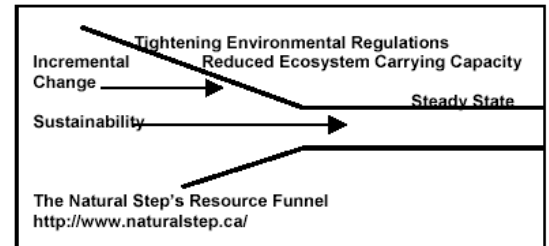
Editorial

This issue of Sustainability Now explores sustainable industrial processes. Given the recent entry into effect of the Stockholm Convention on Persistent Organic Pollutants (see page 3), it is worth reflecting on the progress of our own major producers of POPs, the pulp and paper industry.

In 1992, following widespread fisheries closures, the British Columbia Provincial Government mandated phasing out the release of dioxins and furans, 2 of the pollutants targeted by the Stockholm Convention. At that time pulp bleaching in BC was achieved primarily through use of chlorine gas. The industry was given 10 years from 1992 to eliminate dioxin and furan releases. It responded by investing billions into replacing elemental chlorine bleaching processes with chlorine dioxide technology, the so-called elemental chlorine free process (ECF). Switching to ECF greatly reduces dioxin and furan releases but does not eliminate them. In addition, coastal mills produce dioxin and furan emissions from the combustion of salt laden wood waste for fuel. The BC pulp industry lobbied the Provincial Government for concessions and at the eleventh hour the law was amended to allow some releases. The pulp industry continues looking at ways to reduce releases from fuel combustion.

The Stockholm Convention now adds more pressure to the BC pulp industry to eliminate dioxin and furan releases. By switching to ECF, the industry

invested in incremental change when a completely new approach is needed. This is an example of what the Natural Step Framework calls the "Resource Funnel", where stricter environmental regulations and reduced ecosystem carrying capacity continuously reduce the limits of acceptable pollution. The diagram shows how incremental change extends the technology's lifespan, whereas complete conversion to sustainability allows one to avoid running up against increasing tighter walls. We are in the reduction phase and will not reach steady state, indicated by the straight lines, for some time.



A number of local companies are avoiding the walls of the funnel by investing directly in sustainability. The Association of Professional Engineers and Geoscientists of BC recognizes such projects through its annual Sustainability Award. If you would like to nominate a sustainable project, see page 3 for details.

Anthea Jubb, EIT, Editor

In Conversation with Linda Coady, VP Pacific Region

World Wildlife Fund Canada



Linda Coady is a Past Vice President of Environment for MacMillan Bloedel and Weyerhaeuser's BC Coastal Operations. She now leads the World Wildlife Fund (WWF) program in British Columbia. WWF is one of the world's oldest, largest and most respected conservation organizations.

AJ: What is your definition of sustainable industry?

LC: Sustainability is about intergenerational equity, and the famous three-legged stool of economic, environmental and social wellbeing. It is about

reconciling local and global perspectives, and here in British Columbia it is about reconciling crown and aboriginal title.

AJ: The WWF Pacific Region appears to have a unique approach when it comes to partnering with industry. Can you tell me how that approach developed and what the history is behind it?

LC: WWF is a global network of environmental organizations in about 70 different countries. The focus of the projects are conservation and sustainability, and, where necessary habitat, wildlife and

In Conversation with Linda Coady, Cont.

ecosystem restoration. WWF works with a variety of different groups on these projects including government, business, research organizations, local communities and indigenous people. It approaches its projects on a partnership and collaboration basis. Partnership is a core strategy at WWF but there are other core strategies such as public education and science.

AJ: What are the benefits of partnerships?

LC: Partnering enables you to make progress on complex issues that nobody can make progress on unilaterally. Environmental issues are, by definition, interconnected. They are seldom issues that any one group, whether it is business, government, or an environmental group, can solve on its own. Partnerships, collaborations and joint ventures around specific projects are ways to deal with more complex issues.

AJ: What kind of barriers have you encountered when trying to develop partnerships?

LC: It is hard to have a working partnership between interests that are really quite diverse in their values, makeup, how they make decisions, the resources that they have at their disposal and the kind of people they can hire. Partnerships or relationships between groups that don't look or think like each other are really very challenging to make work.

The more diverse the partnership the harder it is to make it work. You have to have a clear understanding around objectives, how money is spent and how people are retained. It just means that you have to spend some time on the structure of the partnership up front. And it takes a lot of care and nurturing as you move through it.

AJ: Can you tell me about some of your partnerships?

LC: At this point we have a number of projects going with forest companies, including Tembec, Abitibi Consolidated, Norske Canada and Issaak. The Norske project is about reducing the environmental footprint of their paper mill in Port Alberni. The Issaak project is about getting a working model for eco-forestry up and running in Clayoquot Sound, so that involves business innovation around product lines and marketing. And the projects with Abitibi and Tembec are focused on identifying high conservation value forests within their management tenures.

Through some of our partnerships we can draw attention to the fact that these companies are really taking sustainability seriously and trying to incorporate it into their business. It doesn't mean that they have actually done it – sustainability is a journey - but there are tangible measures along the way. If companies aren't seen to be moving on these things they will have difficulty getting access to human, economic and natural capital.

AJ: In your experience, are there companies in BC that stand out as exemplifying sustainability?

LC: Because I am just starting this program, the companies I mentioned above are by no means an exhaustive list, At this point the WWF projects in BC are mainly in the forest sector, but my job is to grow the portfolio of projects and that is what I hope to do.

There are lots of other companies in BC that have public platforms and statements around sustainability. Certainly BC Hydro and Alcan, are examples of large companies that have made very public commitments to sustainability. Vancity has led the charge on sustainability reporting and independent auditing. So I think a lot of companies in BC, whether they are big or small, are looking at sustainability as part of a good business strategy.

AJ: Could you comment on your experience regarding the use of language when communicating with different groups such as engineers, government and the public?

LC: To be able to communicate well about sustainability you have to be able to move between different levels of complexity with the issues involved. The touchstone is to speak to the core values behind sustainability. You can develop very complicated equations about how you define sustainability, but it comes down to the values that people can relate to. People are very interested in how they can translate those values into everyday life in the products they buy, the houses they live in and the cars they drive. The values are core, the "what" is core. The "how" will vary quite significantly and can become very complex, but the "what" is core.

AJ: What advice can you give professional engineers and geoscientists who's work is targeted by community or environmental groups?

LC: I think you have to talk with these groups and know where they are coming from. Listening is a skill that usually needs to be developed. You have to be open with other ideas, and establish a line of communication. Establishing a line of communication doesn't mean you are going to agree but you may find agreement on some things. Effective partnerships between diverse interests mean that you might be able to work together toward a common goal because different groups bring different strengths to the table.

I don't think that you should assume that just because you are obeying the law you have social license. You can always exercise your legal rights, but you might want to check that your activities are aligned with social values, because if they are not you risk losing social license to operate.

Social and environmental groups tend to have more credibility than government and industry with the public on certain types of issues. Whereas government and industry tend to have more capacity to make things happen. If you can put those things together you can get a more powerful, more effective outcome. Some of these relationships help make you get smarter. They make you think of things you wouldn't think of otherwise, because they are not coming from your internal value system. They may make you aware of important values that are out there in the marketplace where you sell your product.

AJ: Please recommend a favorite book or website.

LC: Dee Hock of the Chaordic Commons: <http://www.chaordic.org/>

Remaking The Way We Make Things by William McDonough and Michael Braungart.

British Columbia Looks Forward to First Wind Farm

An APEGBC member, Winston Stothert, P.Eng is heading up Holberg Wind Energy GP, Inc, whose proposed wind farm on northern Vancouver Island represents an exciting first for British Columbia. The proposal follows up on the wind mapping of Vancouver Island performed by BC Hydro in 2001. According to the Terms of Reference for the Environmental Assessment Application, the proposal calls for a 58.5 MW wind farm located on two mountain ridges. The farm will produce enough electricity to power approximately 17,000 homes. It will have 45 wind turbine generators, each one between 60 and 100 meters tall. The generators will have 3 blades, between 35 and 45 meters long that revolve at up to 25 RPM.

Given the growing demand for electricity on Vancouver Island and the controversy surrounding many of the currently available new sources, the Holberg Wind Farm seems to have been proposed at just the right time. However, even though wind farms offer many ad-

vantages over fossil fuel power, they have been met with resistance in many communities. In the United States, The Audubon Society is a non-governmental organization devoted to conservation and protection of bird species. It has been very active in the US trying to reduce the common problem of bird and bat mortality at wind farms. Local residents groups in the US have also resisted wind farm development due to its visual impact.

The Holberg Wind Farm is likely to have its own challenges, as its proposed location is under multiple uses and claims. It is in the traditional territory of the Quatsino First Nation, is under an Tree Farm License held by Western Forest Products, and is partially on Department of National Defense land. Even so, given the potential to produce electricity without emissions or fisheries impact, this wind farm seems likely to generate more interests and optimism than opposition.

Stockholm Treaty on Persistent Organic Pollutants Enters Into Effect

Canada was the first nation to ratify the Stockholm Treaty on Persistent Organic Pollutants (POPs) on May 23, 2001. On May 17, 2004 the agreement came into effect following ratification by 50 nations. Implementation of the agreement will dramatically reduce or eliminate the production and transportation of the following 12 toxic chlorinated organic chemicals: aldrin, chlordane, DDT, dieldrin, endrin, heptachlor, hexachlorobenzene, mirex, PCBs, toxaphene, dioxins, and furans.

As a northern country, Canada is particularly impacted by pollution from chlorinated organic chemicals. These pollutants are volatile at moderate temperatures but condense at high latitudes. Hydrophobicity causes them to bio-accumulate up the food chain reaching much higher concentrations in the fatty tissue of mammals than in the environment. According to findings published in the *Consultations on Canada's National Implementation Plan under the Stockholm Convention on Persistent Organic Pollutants* by the

Hazardous Air Pollutants and Transboundary Air Issues Branch of Environment Canada in 2004, "Levels of POPs in Canadian Inuit populations are among the highest observed in the world...in the Kitikmeot, Kivalliq and Baffin Regions of Nunavut, 40 to 65 per cent of the women participants had levels of PCBs up to five times above values used by Health Canada and the Governments of the Northwest Territories and Nunavut to identify a level of concern." The environmental persistence and biological activity of these pollutants lead to cancer and reproductive disorders.

A number of the listed chemicals are pesticides not registered for use in Canada. Dioxins and furans are unintentional by-products of several industries, including the pulp and paper industry. Most British Columbia pulp and paper mills release dioxins and furans, and will be affected by the implementation of the Stockholm Convention.

Call for Nominations for APEGBC Sustainability Award

APEGBC is pleased to invite nominations for the second annual Sustainability Award. The Sustainability Award was created to recognize the important contribution that engineering and geoscience make to the well being of human life and the ecosystem on which we all depend. It further seeks to recognize the positive role of human qualities such as ethics, imagination, reason and common sense in achieving this end.

The award is open to any project, product, organization or individual that has demonstrated a commitment to, and understanding of, the

concept of sustainability and/or has applied one or more of the Sustainability Guidelines

The award will be presented at the annual APEG General Conference, held October 21-24 at the Fairmont Chateau Whistler Hotel.

The deadline for nominations is **June 30, 2004**. See sustainability.ca for the full award criteria and nomination procedures or contact Anthea Jubb at 604-412-4868 or info@sustainability.ca.

UK Engineering School Recruits Young Women with Renewable Energy

The prestigious Imperial College in London, England is having success recruiting the best and brightest young women into undergraduate engineering programs by demonstrating the role of engineers in developing renewable energy projects.

Imperial College of Science, Technology and Medicine is an independent constituent part of the University of London. It has produced 14 Nobel Laureates in its 100 year history. Despite its prestige, Imperial College is suffering from the UK wide phenomenon of declining enrollment in engineering undergraduate programs, and stagnant enrollment by young women. According to Dr. Ruth Graham, Research Fellow at Imperial College, in the UK women make up 6-7% of engineering undergraduate students and only 1% of engineering professors. Concerned about the negative economic impact associated with a reduction in engineering talent, the UK government, academia and industry have been investigating ways to



recruit more young women into engineering.

Recruiters investigated why many young women in the UK with strong academic records in math and sciences were not considering engineering as a career. They discovered that these young women considered engineering not to be a helping profession that benefits society. To address this misconception Imperial College partnered with Shell to develop a 2 day competition for young women to design and build a wind turbine. After holding regional heats throughout the UK, the event final will be held 12th - 14th July 2004 at Imperial College. Prizes included a trip to Churchill, Manitoba to study climate change with Dr. Peter Kershaw of the University of Alberta, and engineering scholarships to Imperial College. Results from the regional heats and the pilot program run last year show that the percentage of participants considering a career in engineering rose from 34% to 79% by the end of the competition.

Alberta First to Introduce E-Recycling

Source: Government of Alberta <http://www3.gov.ab.ca/env/waste/ewaste/>

Alberta is moving ahead as a leader in environmental management, with the creation of the first provincial electronic recycling program in Canada.

Effective October 1, 2004, televisions, computers and related equipment currently going into Alberta's landfills will be collected, reused, recycled and turned into new products and economic opportunities for Albertans.

In 2004, more than 190,000 televisions and 90,000 desktop computers will be discarded from Alberta households. These electronics contain materials such as lead, mercury, cadmium, beryllium and PVC plastics that can cause significant environmental and health risks if they end up in Alberta landfills. However, the metals, glass and plastic in these used products can be recycled into valuable products, including the next generation of electronics.

In the initial phase of the program, televisions, computer monitors, CPUs, laptops, electronic notebooks and printers will be accepted.

Primer on Sustainability in Consulting Engineering and Geoscience

APEGBC is pleased to announce the addition of a Consulting Engineers and Geoscientists Module to the Sustainability Primer. The Sustainability Primer is a living document that describes how professional engineers and geoscientists are applying sustainability to their work.

The first module of the primer provide an overview of sustainability in professional engineering and geoscience. The second module explains the 7 APEG Sustainability Guidelines:

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.

Practice specific modules give background and examples of sustainability in a range of disciplines, including Municipal Engineering, Mining, Buildings, Transportation and now Consulting Engineering and Geoscience. Research is underway for a module on industrial processes to be published in the fall.

The primer can be downloaded from www.sustainability.ca or ordered from APEGBC by calling Anthea Jubb, EIT, Sustainability Researcher at 604-412-4868.

The Twelve Principles of Green Chemistry

From: Anastas, P. T.; Warner, J. C. *Green Chemistry: Theory and Practice*, Oxford University Press: New York, 1998

- Prevention**
It is better to prevent waste than to treat or clean up waste after it has been created.
- Atom Economy**
Synthetic methods should be designed to maximize the incorporation of all materials used in the process into the final product.
- Less Hazardous Chemical Syntheses**
Wherever practicable, synthetic methods should be designed to use and generate substances that possess little or no toxicity to human health and the environment.
- Designing Safer Chemicals**
Chemical products should be designed to effect their desired function while minimizing their toxicity.
- Safer Solvents and Auxiliaries**
The use of auxiliary substances (e.g., solvents, separation agents, etc.) should be made unnecessary wherever possible and innocuous when used.
- Design for Energy Efficiency**
Energy requirements of chemical processes should be recognized for their environmental and economic impacts and should be minimized. If possible, synthetic methods should be conducted at ambient temperature and pressure.
- Use of Renewable Feedstocks**
A raw material or feedstock should be renewable rather than depleting whenever technically and economically practical.
- Reduce Derivatives**
Unnecessary derivatization (use of blocking groups, protection/ deprotection, temporary modification of physical/ chemical processes) should be minimized or avoided if possible, because such steps require additional reagents and can generate waste.
- Catalysis**
Catalytic reagents (as selective as possible) are superior to stoichiometric reagents.
- Design for Degradation**
Chemical products should be designed so that at the end of their function they break down into innocuous degradation products and do not persist in the environment.
- Real-time analysis for Pollution Prevention**
Analytical methodologies need to be further developed to allow for real-time, in-process monitoring and control prior to the formation of hazardous substances.
- Inherently Safer Chemistry for Accident Prevention**
Substances and the form of a substance used in a chemical process should be chosen to minimize the potential for chemical accidents, including releases, explosions, and fires.

Upcoming Events

June 22, 5:30 pm CERC/NRC Joint Seminar: The Kyoto Accord and Some of Its Implications for Canadians. Speaker: Professor John Grace, Department of Chemical and Biological Engineering, Clean Energy Research Center, The University of British Columbia. Location: HSBC Hall, UBC Robson Square, Vancouver. Cost: Free. Registration: Not required.

June 27-30 Signals of Intent: Sustainability + Design. Signals of Intent focuses on the challenges and opportunities presented to designers of all kinds - architects, planners, engineers, industrial and graphic designers - with regard to sustainability. Location: Emily Carr Institute, Vancouver. Cost and registration: visit <http://www.eciad.ca/signalsofintent/>.

October 15 Massive Change: World Visionaries in Dialogue. This event looks at the future of global design. Location: Vancouver Art Gallery. Cost and Registration: See <http://www.massivechange.com/>.

November 10-12 Greenbuild International Conference and Expo. Hosted by the US Green Building Council, this event is currently the leading green building conference in North America. Location: Portland, Oregon. Cost and Registration: See <http://www.greenbuildexpo.org/>

Sustainability Now

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