

program. The Bridge Coastal program augments the existing Columbia and Peace Fish and Wildlife Compensation Programs (annual allotments \$3.8M CDN and \$1.5M CDN respectively).

The Challenge: Securing and supporting the widespread participation of First Nations in WUPs was recognized from the outset as both a key to success, and a potential challenge. First Nations governments and communities in British Columbia have varying levels of expertise and interest in participating in a WUP process. Furthermore, First Nations are participating in a great number of decision-making processes that further tax their resources and create competing priorities.

Solution – The First Nations (FN) WUP Committee has a representative on the Inter-agency WUP Management Committee, as well as on the other program development activities. First Nations participants in WUP can access the FN WUP Committee for assistance in WUP participation, including scientific and legal advice concerning aboriginal rights to resources.

- Solution – The multi-attribute tradeoff process offers an effective and equitable tool for incorporating traditional ecological knowledge (TEK) into “western” decision-making. Cross-cultural learning is a valuable objective of all WUPs.

## ***Results***

As an effective route to interest-based negotiation and structured decision-making, the WUP process is widely supported and accepted because it offers superior results to all participants, including BC Hydro, over traditional positional or litigative dispute resolution

Explicit learning about values and interests of all participants. BC has been a leader in multi-stakeholder land-use planning, and participants at WUP tables understand and embrace the benefits of interest-based, multi-party decision making. Participants tend to move from black and white thinking toward a greater understanding about the interplay between economics, social and environmental interests. The complexities of BC Hydro’s integrated operations are becoming better understood, while BC Hydro learns about the intricacies of fisheries and habitat management and social values. The end result is more informed decisions and shared responsibility for outcomes

Inter-agency and inter-personal relationships are built through the WUP process, between government agencies, First Nations, the public and BC Hydro. This will be an ongoing legacy of WUPs, making collaboration and negotiation a preferable alternative to cooperation from agencies, rather than the opposition and

conservative environmental management that are often sought when the science and effects are unknown or uncertain

The scientific database, methodologies and transferable knowledge are built through investment in sound scientific investigation into the operational effects on fish, environment, recreation and First Nations' values. A WUP may refine, remove or add requirements and operational effects. Scientific modeling and methods will have ongoing value and benefit to BC Hydro and other hydroelectric facilities.

The completed Stave Water Use Plan achieved incredible results. Recommendations for change were made through the WUP process and once adopted, these changes met with improvements across all objectives, including economic, social and environmental objectives. They type of win-win situation clearly demonstrates that collaboration can lead to sustainable decision-making for all players.

New hydro-operations will reflect social and environmental costs. Program costs will be assessed in several ways: traditional calculation of economic losses due to restricted power generation will be balanced against reduced litigative costs, and gains in economic welfare and economic efficiency by internalizing environmental and social impacts

BC Hydro's Water Use Planning process is ongoing. Many of the lessons learned at early WUP tables are being applied to the next round of tables.

Inclusive representation in the WUP process that allows for a broad range of public interests. This ensures credibility, exposure to the full range of ideas and options, wide spread support for the process and an effective and efficient WUP program

Explicit and transparent sharing of information, interests and values is essential to completing a successful WUP, and to ensuring participants contribute in good faith through to the end

Creative exploration of alternatives has led to participants seeking ways to achieve mutual benefits, rather positions that exclude or compete with other interests

Focus time and the process on the learning and creative steps. Large group processes can run the risk of using up "precious time" on procedural issues – effective facilitation through all of the WUP steps enables participants to spend time actively working and learning in the steps they care about

For up-to-date information on the BC Hydro Water Use Planning program, including links to individual Water Use Plan projects and a “quick facts” section, please consult BC Hydro (2004). As of August 1, 2001, 2 WUP tables are completed, 13 are in progress and the final 7 are scheduled to start in the next year.

### **Providing and Informing Customer Choice: The Climate Neutral Network**

A handful of companies are going beyond “energy efficiency” to seek ways to leave no carbon footprints behind. Their Climate Neutral Network stretches the horizons of orthodoxy for those companies that are trying to reduce greenhouse gas (GHG) emissions.

Over the past three years, the US-based Climate Neutral Network has built and alliance of companies that are learning how to build market share and customer brand loyalty by offering their customer’s products and services that achieve a net zero impact on the Earth’s climate.

Participating companies can become certified as Climate Cool on achievement of complete reduction and offset of all carbon emissions. A company that chooses to become a Climate Cool enterprise agrees to reduce and offset all of the climate impacts for the full spectrum of its internal operations from the point at which raw materials are received to the point at which finished product is delivered. Products or services can also be certified individually as Climate Cool. Product certification requires a reduction and offset of the greenhouse gases generated at each stage of the life cycle on a cradle-to-grave basis: the sourcing of materials; manufacturing or production; distribution, use, and end-of-life disposal.

Why do companies participate? Shanklee Corporation, the first company to receive Climate Certification, sees participation in the Network as an opportunity to leverage the company’s 40-year history of environmental focus and performance. Participation is a means of branding the organization and not just the individual products. “We felt strongly about moving beyond past performances and striving just for reductions” says Ken Perkins, Environment, Health & Safety Director. “We were attracted by the bold objectives of being climate neutral. It is not just old wine in a new bottle; the Network is innovative, groundbreaking and distinguishable”.

Organizations in the network are now actively collaborating to co-design new Climate Cool products and partnerships, and a creative and rapidly expanding company-to-company market is developing. The Saunders Hotel group, also certified Climate Cool, was seeking lighting accommodations. Saunders needed to develop a means of reducing the energy consumption of hotel lighting without sacrificing ambiance. Philips Lighting worked with Saunders to design alternative bulbs. They

came up with more energy-efficient alternatives that were also smaller in size and weight.

“This provided an opportunity to plug-in new designs,” says Paul Walitsky of Philips Lighting, “the climate Neutral network is providing new business opportunities to put products in practice”. Philips Lighting is also working with US apparel firm Norm Thompson to provide energy-efficient lighting to the Ecumenical Ministries of Oregon. As a result of this and other efforts, Norm Thompson recently received their Climate Cool certification.

The Network more recently began certifying events that achieve a zero emission footprint. This includes a comprehensive calculation of the estimated emissions from an event using the Climate Neutral metrics that closely mirror the WBCSD and WRI Greenhouse Gas Protocol Corporate Accounting and Reporting Standard.

The first certification of this kind was the 2002 Winter Olympic Games in Salt Lake City. This includes measurement of greenhouse gases from such sources as athlete, official and spectator travel to Salt Lake City, transportation around town, and the events and venues themselves, including even the burning of the Olympic torch. The offsets required were achieved through donations of greenhouse gas reduction from DuPont and Petro Source, and the effort was supplemented by the planting of 18 million trees. The reductions that DuPont is donating are from process related reductions of nitrous oxide, representing reductions beyond their internal commitment. In total, the emission reductions exceed the calculated emissions footprint of the Games by three times.

“By becoming Climate Cool, companies are issuing a leadership challenge,” says Sue Hall, executive director of the Climate Neutral Network. “These exciting precedents are attracting broad interest from many companies who are able to leverage Climate Cool activities for their own objectives.”

For more information on the Climate Neutral Network see CNN (2004).

### **Corporate Social Responsibility: Eskom HIV/AIDS Program**

Eskom is South Africa’s wholly state-owned electricity utility. It has 24 power stations and is one of the lowest cost producers of electricity in the world. The company supplies electricity to over three million customers via 306 thousand km of transmission and distribution lines, with a nominal capacity of 40,585 megawatts. Eskom supplies approximately 95% of the country’s electricity and is one of the lowest cost producers of electricity in the world.

Since the start of the AIDS epidemic 83% of all AIDS deaths so far have taken place in Africa. The sub-Saharan part of Africa holds the majority of the worlds infected individuals. In South Africa, the estimated prevalence is currently 4.7 million individuals. As an organization conducting its business mainly in South Africa, the containment and management of HIV/AIDS is a strategic priority for Eskom.

### ***Targets***

Eskom's employees, suppliers and customers were all important components of Eskom's HIV/AIDS program. The main objective of the program was to minimize the impact of HIV/AIDS on Eskom, and thus a set of programs were formulated and implemented throughout the organization, and resources were dedicated to these programs.

*Information Management* – Establish infrastructure to help Eskom maintain a strategic focus on the developments related to the prevalence of HIV/AIDS in the business

*Self-awareness* – Increase the level of self-awareness of HIV status among Eskom employees

*High Risk* High-risk areas and situations for contracting HIV Infection were identified in the organization, and are being addressed by various business units.

*Communication* – Develop and implement a communication strategy for the overall response strategy to support the strategic management of HIV/AIDS

*Education and Training* – To empower all employees with skills, knowledge and information to deal with HIV/AIDS effectively

*Care and Support* This program caters for psychological support of HIV positive employees, the free treatment of sexually transmitted infections and monitoring of TB treatment

*Policies and Practices* – The program ensures that Eskom policies and practices do not discriminate against HIV positive

### ***Actions***

The actions taken in order to meet the targets were:

A dedicated budget of 125 South Africa Rand per employee was spent on HIV/AIDS projects and activities in 2000 (excluding the salaries of employees working full-time on the HIV/AIDS program)

Partnerships were established with national and international institutions and organizations working in this field. This includes a search on a HIV/AIDS vaccine where Eskom works with the Department of Health, Medical Research Council and Institute of Virology

Benchmarking Eskom's activities against South African businesses and International businesses Eskom also conducted a voluntary, anonymous and unlinked surveillance study in 1999. Following these results, Eskom commissioned the Harvard Institute for International Development (HIID) to analyze the short, medium and long-term economic impacts of HIV/AIDS to the organization, in order to enable it to scale up its interventions. A set of Response Strategies was formulated to meet the challenge

During 2000 a cycle tour was arranged to raise funds to fight the HIV/AIDS epidemic. An education and awareness program was launched. This included a wellness week, induction programs for new employees and peer education workshops

Participation of Eskom's business units in World AIDS day with various programs

## ***Results***

All Eskom employees have received HIV/AIDS awareness messages, so that the challenge is now "beyond awareness"

Eskom is a member of the Global Business Council (GBC) against HIV/AIDS

Eskom contributed 30 million South African Rand over 5 years toward the vaccine development

Eskom chairs the Southern African Power pool forum on HIV/AIDS. The main purpose of this forum is to share experiences and assist in capacity building

Eskom shared its experience and assisted more than 20 companies in the country with information to help them start their own programs

### *Achievements*

Eskom's HIV/AIDS program was presented to the XII World Aids conference, and was commended as a good model for a workplace program

Eskom's HIV/AIDS program has received two international awards, for Business Excellence by the Global Business Council, and for the involvement of people with HIV/AIDS in the programs, including employing them as members of the staff, from The United Nations AIDS program

The HIV/AIDS Program was nominated for a South African award and has three best series documents that are distributed world-wide

### *Lessons Learned*

Businesses are not immune to the devastating impact of HIV/AIDS

New infections were projected to cost Eskom 4-6 time the annual salary per individual infected

Annual costs of existing HIV infections during the years 2006-2010 will average 7% of the payroll

### **Creating Sustainable Livelihoods: Farmer-sized Seed Packs in a Sustainable Community-Oriented Development Program**

Kenya is importing food. Its farmers, despite their skills, cannot produce enough to feed themselves and the urban populations. Soil has been depleted by years of continuous cropping, and is chronically deficient of nutrients. Thus crop growth is poor, and farms lack organic matter. In some parts of Kenya, despite good rainfall, corn now grows only knee-high, leaving the ground exposed to rain and erosion. Yields are as low as 50 kg grain/ha, far below the potential yield of four metric tons/ha.

State and international aid programs have provided fertilizers, ploughs, and tractors on credit. But when the programs end, farmers are unable to pay back the loans and continue to maintain the equipment. The size of provisions has also been a problem, with the smallest bags of fertilizer often weighing 50 kilos. "This is an investment of a few weeks of income, and you can only carry it around if you have a bicycle," says Paul Seward, and plant nutrition expert. Seward has teamed up with



Dismas Okello, the local community development expert who formed the Sustainable Community-Oriented Development Program (SCODP). Over the last five years, they have worked closely with farmers in Siaya district to devise a mini-pack project to provide quality seeds and fertilizers at affordable prices.

“For 5 shillings (US 6 cents) you can buy a chewing-gum sized sachet of 250 seeds of the vegetable Sukuma-wiki. For another 10 shillings (US 12 cents) you get a pack of fertilizer for 150 planting holes. The results are dramatic. A good farmer can earn anything from between 2,000 to 4,000 shillings (US \$25-50) from using these packs.” Having sold its first kilo bag of fertilizer five years ago, SCODP is now selling 300 tons of fertilizer a year to small-scale farmers in affordable quantities. The market potential is for several hundreds of thousands of tons.

SCODP has grown since 1997 to become a well recognized and well-supported, successful grassroots projects. Specialist assistance has been provided to SCODP to address the many pests affecting corn, sorghum, beans, cowpeas, and pigeon peas, including training in crop protection related issues. Field trials were started in 2000, and are continuing in order to develop solutions for specific pest problems. Crop protection products in small packs and small application devices are now also part of the whole technology package that farms can access through SCODP. Due to its success, USAID and the Rockefeller Foundation are assisting SCODP to extend its approach to other regions in Kenya.

## Engineering and Construction Research for Sustainable Development<sup>10</sup>

A report prepared by the Civil Engineering Research Foundation (CERF), entitled “Creating the 21<sup>st</sup> Century through Innovation; Engineering and Construction for Sustainable Development,” provides 38 research prospectuses in five construction industry categories: Management and Business Practices, Design Technology and Practices, Construction and Equipment, Materials and Systems, and Public and Government Policy (CERF 1996). A selection of those prospectuses most related to sustainability and sustainable development from each of the five categories is included in this reading. The overview and challenge for each category is also included.

While somewhat dated, this reading is included in this volume because of its global innovation and comprehensive research agenda for achieving sustainability in

---

<sup>10</sup> This reading is abstracted from the 1996 Report of the Civil Engineering Research Foundation (CERF), entitled “Creating the 21<sup>st</sup> Century through Innovation; Engineering and Construction for Sustainable Development.” (CERF 1996) This material is included in this report with permission.



the construction industry, much of which still needs to be accomplished in advancing sustainable engineering practice.

## **Management and Business Practices**

An effective management process is a key ingredient in providing the design and construction services needed for sustainable development in the 21<sup>st</sup> century.

“Management,” defined as the act, art, or manner of planning, organizing, controlling, or directing, is by its very nature a diverse topic. It can be applied to almost any human activity. Management skills have always been particularly critical when it comes to the successful completion of construction projects with their complex and diverse elements. Add to this the demands of sustainability, and the requirement for strong, effective management becomes even greater.

### ***The Challenges for Management***

The burden of satisfying both the need to efficiently deliver safe, reliable, and functional infrastructure, while preserving and enhancing environmental quality, is the responsibility of construction industry management. To meet this challenge, management will need clear, uniformly understood and accepted objectives that define the parameters of sustainability and new tools and methods that allow the monitoring of the process. Without this basic information, management will be unable to make sustainable practices a reality.

Numerous barriers also impede the adoption by the construction industry of innovative technologies that support sustainable development. For example, the construction process all too often is marked by adversarial relationships and distrust that make consensus building difficult—if not impossible—to achieve. Existing procedures for project selection, characterized by inflexible and inappropriate rules and regulations and codes and standards, also inhibit management’s ability to use innovative technologies and systems to further sustainable principles. Finally, given the dynamic nature of the industry, management often lacks knowledge of state-of-the-art alternatives to apply innovative solutions to a particular project.

### ***Prospectus Summaries***

#### **Managing Sustainability in Project Selection**

Owners of constructed facilities usually consider direct costs and regulatory requirements in selecting constructed facilities. Often ignored are other considerations such as renewability, recyclability and reuse, energy consumption, operating cost, waste pollution reduction, and risk and liability. These should be incorporated into an owner’s decision process. This prospectus proposes to field test and conduct demonstrations to provide information based on the operation and

maintenance cost of these facilities to help owners become familiar with sustainable construction opportunities that ultimately increase the likelihood they will be adopted.

### Establishing Affordable Sustainable Construction Objectives

This prospectus addresses the cost impact of achieving sustainability. The work should develop a framework for allocating costs and benefits, develop methods for observing these values, and report on the implications for design, construction, materials, operations, and human resources. Anticipated outcomes of the research will include a model for conducting cost-benefit analyses that involve sustainability. These models should include examples and case studies, an electronic tutorial for distribution on the Internet, and applications across various projects in the public and private sectors.

## **Design Technology and Practices**

Design is the process of identifying and solving problems having to do with the form, use and management of facilities and communities, infrastructures, and other elements of our built environment. Design encompasses a range of activities that precede construction or other changes in the built environment. The outcomes of design inevitably depend on the context in which they perceive and represent problems and solutions.

The process and outcomes of design are central to achieving sustainable development. Private and public sector entities act on the designer's recommendations to change and use the built environment. Design technology and practices—the procedures, methods and tools designers use—shape the ways designers perceive problems and solutions as well as influence designers' productivity, accuracy and efficiency.

### ***The Challenges for Designers***

Design Technology and Practices industry experts see the need for defining sustainability, for streamlining the design process, for developing knowledge-base systems, and for bringing understanding and awareness of sustainable design and construction opportunities. These themes encompass the challenges facing designers seeking to achieve design goals and to lead the engineering and construction toward achieving sustainable development in the 21<sup>st</sup> century.

Designers are critical players to the successful introduction of innovative and sustainable facilities. The challenges facing the industry broadly are often encountered first by construction designers. Meeting these challenges requires dealing with a series of barriers, including a public and the design community that