the necessity of education has emerged as an important requirement in the prevention of poverty. A basic education enabling people to read, write and do simple arithmetic is a powerful tool in equipping people to care for themselves and their families. It enables them to get a job, do some entrepreneurial work, figure out the simple things in life, and make better use of indigenous knowledge. The first requirement of education is the desire to attend school, and the second requirement is the presence of a primary school in the community.

First, an analysis of the objectives, methods and processes of Canadian NGOs working in school construction projects in Nicaragua was done.

Secondly, the positive and negative impacts of school construction projects on families and the local community in Nicaragua were identified and analyzed.

Thirdly, the positive and negative impacts of school construction projects by Canadian NGOs on Canadian volunteers were identified and analyzed.

Fourthly, the causes of the positive and negative impacts of school construction projects on families and the local community in Nicaragua with a particular focus on participation were examined and explained.

Lastly, recommendations for action by Canadian NGOs and local communities and families with respect to mitigating negative impacts and reinforcing positive impacts of school construction projects were made and given to the Canadian NGOs.

Key words: *impacts of school construction, development, Canadian NGOs, Nicaragua*

## PROGRESSING TOWARD SUSTAINABLE DEVELOPMENT THROUGH REFLEXIVE PROCESSES

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This paper explores how the changing context of sustainable development and corporate social responsibility is affecting the role of impact assessment as a "way of doing business." Good science in impact assessment is crucial to decision making, and clearly great strides have been made over the past decades. However, the context of sustainable development is evolving, and with that, so is the application of basic principles of sustainable development. This paper provides highlights of these principles both from the vantage point of environmental legislation, as well as corporate strategy. Companies are facing rapid changes in their relationships with stakeholders, in how decisions are made, and in how their "license to operate" is achieved and maintained. This also affects the traditional view of project timelines, in particular when projects "start" and "finish." Increasingly, competitive advantage is being captured by companies that adopt new approaches to business. This is particularly true where those approaches involve open engagement and multi-stakeholder dialogue. Sustainable development business objectives include striving to reach shared understanding and "win-win" solutions with diverse stakeholders, and recognizing the full range of economic, environmental and societal benefits (as well as risks) associated with their business activities. Experience in these areas builds competencies such as active listening, dealing with ambiguity and complexity, and systems thinking, which contribute to competitive advantages in many areas of the business. These multi- stakeholder, "reflexive" processes are discussed. This extends the role of impact assessment from a rather isolated project development perspective into the very fabric of business planning, development and growth activities. The focus moves beyond technical excellence and promotes a holistic interpretation of critical aspects. Challenges in leveraging the benefits of these approaches are discussed.

Key words: *sustainable development, principles, license to operate, stakeholders, corporate strategy, reflexive processes*

## REGIONAL GUIDELINES ON EIA IN A TRANSBOUNDARY CONTEXCT CONVENTION

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In 1991, the United Nations Economic Commission for Europe agreed an international convention on EIA in a transboundary context. In practice, there has not been much practical guidance on how to implement the requirements at the country level, and none at the project level. This has proved problematic in the region of the Caspian Sea, where major off-shore oil projects are undergoing EIA and often have the potential to affect two or more of the littoral states. Some of the countries have ratified the Convention, and have obligations which are binding under international law. The European Bank for Reconstruction and Development has worked on an initiative in the Caspian Region with organisations within the United Nations and representatives of the five countries bordering the Caspian Sea (Russia, Kazakhstan, Turkmenistan, Iran, and Azerbaijan). The initiative involved negotiating and developing practical guidance on transboundary communication in a sensitive region with different cultures, religions, and politics.

## THE WATER USE PLANNING PROCESS AT B C HYDRO: BALANCING WATER USAGE IN A SUSTAINABLE WAY

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The Water Use Planning Program at BC Hydro was initiated in November 1998. Under the program, twenty-three water use plans were developed for BC Hydro's hydroelectric facilities. The plans will determine how water is to be managed to address the range of water use interests. Plans approved under the Water Act will be written into BC Hydro's water licenses.

BC Hydro's objectives for the program are: to provide greater clarity of operations, in particular greater clarity of regulatory compliance under both the Water Act and the federal Fisheries Act; balance economic, environmental and social values; and build consent to operate.

Key Lessons:

- Broad-based solutions require the participation of all interests, including the regulators. Hence, regulatory frameworks and attitudes may need to be re-shaped
- The importance of consensus is over-rated; the consultative process should focus on aiding decisions rather than dispute resolution
- A well-structured process is critical to collaborative learning, a neutral language for debate, and innovation. That structure must be
- sensitive to the balance of deliberation and analysis
- Joint research breaks down "information hoarding" and positional science and politics
- People don't always know what they want, notwithstanding strong initial positions. The process must help participants construct and
- articulate their personal values and priorities
- Managing today can be easier if one builds in flexibility to respond to inevitable changes in the environmental, social and economic context for
- hydroelectric operations

The Water Use Planning program was initiated as a risk management strategy to secure operational flexibility and consent to operate. The program has not eliminated all pressures on operations but it is setting a strong and positive basis for long term management of BC Hydro's critical fuel supply:
water.

Key words: *hydroelectric,water use, resource planning, sustainability, stakeholder involvement*

## A COMPARATIVE ANALYSIS OF THE ENVIRONMENTAL IMPACT ASSESSMENT PROCESSES OF SELECTED BILATERAL AND MULTILATERAL DONOR AGENCIES (poster)

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Developing countries are largely dependant on foreign aid to improve their economy, environment and more generally, their quality of life. A significant contribution of foreign aid comes from bilateral (i.e., government agencies lending to other government agencies) and multilateral (e.g., regional banks lending to government agencies) agencies. These agencies lend money to developing countries for projects that aim to stimulate and strengthen various economic sectors. For instance, projects can be aimed at strengthening an aspect of the economy or improving a country's energy supply. Often, environmental conditions are attached to the loans that fuel these projects. One example of an environmental condition is the Environmental Impact Assessment (EIA) process. This process is a tool that most bilateral and multilateral agencies use to analyze a project's impact to the environment. The thesis will explore and compare six bilateral and three multilateral EIA processes. The agencies are: Export Development Canada (EDC); Canadian International Development Agency (CIDA); Germany's Ministry of Economic Co-operation and Development (BMZ); Japan International Co-operation Agency (JICA); Norwegian Agency for Development Co-operation (NORAD); Danish International Development Assistance (DANIDA); Asian Development Bank; African Development Bank; and the Inter-American Development Bank. An argument for greater coherence amongst the agency's EIA processes will be made.

Key words: *foreign aid, bilateral and multilateral donor agencies, development*

## A QUALITY AND EFFECTIVENESS REVIEW PROTOCOL FOR STRATEGIC ENVIRONMENTAL ASSESSMENT (SEA) PRACTICE IN SOUTH AFRICA (poster)

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Review of quality and effectiveness is an essential component of any environmental assessment system in order to identify best practice and to facilitate continual improvement. In recent years the challenges involved with the review of Strategic Environmental Assessment (SEA) became apparent in the wake of the success achieved with project level assessment review. These challenges arose primarily due to the multiple forms of SEA and the complexity of the different contexts in which they are conducted, that do not allow for a generic list of review criteria to be applied universally. This research presents a context specific SEA review protocol designed to evaluate the quality and effectiveness of plan and programme level SEAs conducted within the South African context. The protocol consists of a review approach, principles and a framework, as well as key performance areas (KPAs) and key performance indicators (KPIs) designed to measure the quality of inputs and effectiveness of outputs. This allows for a holistic interpretation of the cause and effect relationships between inputs and their results. Findings based on the application of the protocol to a specific pilot study suggested that it was methodologically sound and sufficiently robust to warrant wider application within the South African context.

Key words: *review of strategic environmental assessment (SEA) practice in South Africa, SEA in developing country contexts, SEA quality and effectiveness*

## PLANNING STRATEGIES: FUTURE SUSTAINABLE INTERACTIONS BETWEEN ENVIRONMENT AND A HYDROELECTRIC PROJECT (poster)

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At present, the Environmental Impact Assessment is a compulsory requirement for developing Hydroelectric projects in Mexico. The basis and guidelines for elaborating it are defined by the Ministry of Environment and Natural Resources. However, the methodology for assessing the interactions between the environment and the projects is not defined. In 2002, the National University of Mexico (UNAM) began to prepare for the National Power Company (Comisión Federal de Electricidad - CFE) the Environmental Impact Statement (EIS) for the Hydroelectric Project "La Parota" at State of Guerrero, Mexico. The impacts expected due to the construction and the operation of the power plant were assessed and the mitigation measures for controlling or preventing them were identified. However, for developing a sustainable project is not enough to implement the mitigation measures therefore CFE and UNAM decided to elaborate a Plan for Regional Development. This plan considers the measures for mitigating the impacts proposed during EIS preparation. Tools from strategic planning are being incorporated to an EIA like SWOT analysis (Strengthens, Weakness, Opportunities and Trends) and multidisciplinary workshops are used to set a strategic objective (main focus for the regional development) and strategic topics (foundation of the proposed model). The strategic planning model used is based upon the classic models developed for non-profit organizations and on the planning system used by Mexican Government (Participative Strategic Planning). The results of the EIA showed that some environmental factors such as the sediment contribution could generate impacts on the dam reducing its operation efficiency. For dealing with this, a plan called "Soil Conservation, Ecological Rehabilitation, and Riverbed Stabilization Strategic Plan for the Upper Valley" is being prepared. This plan incorporates tools like the simulation models for having a forecast about different scenarios.

Key words: *environmental impact assessment (EIA), hydroelectric project, strategic plan, compensation*

## HEALTH AND ENVIRONMENT IN POLICY AND PLANNING PROCESSES IN THE NETHERLANDS: THE FIRST STAGES (poster)

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Health in relation to environment has been a field of interest at the levels of national, regional and municipal government in The Netherlands, one of the world's most densely-populated countries, in recent times. Scientists have been informing the government that if the relevant policy is not changed, the government will be confronted with a wide array of health problems in the public that are invisible at present. The quality of life and living environment is expected to decrease - and in some locations, this is already the case. In the Dutch Action Program Environment and Health (Ministries of Public Health, Physical Planning and Environment, 2002), specific actions have been announced that address key points in the field of health and environment, as well as the strengthening of relevant policy. In June 2003, the European Commission put forth a strategy on environment and health, wherein it also took up the connection between environment and health in its policy. This issue is further emphasised in the Kiev Protocol of 2003 on SEA.

People's health is influenced through the surrounding environment, among other issues. These parameters are addressed in policy and planning; an example would be transport and environmental policy. Very often, however, implicit attention only is paid to health issues. In order to avoid that only implicit attention is paid to health effects in policy and planning processes, more explicit attention must be paid to these issues in the initial stages. At DHV, the first attempts have been made to examine health impacts from environmental issues in a more explicit manner at the level of the neighbourhood and the city, reflecting the nation and the EU's growing interest in this topic area. Health impact assessment is a growing field at DHV and in The Netherlands, but its importance is coming swiftly into recognition. This poster demonstrates the growing importance of this field in The Netherlands.

Key words: *health, environment, quality of life, living environment, action program environment and health, health impacts, health impact assessment*

## CORPORATE SOCIAL AND ENVIRONMENTAL RESPONSIBILITY

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Traditionally, environmental protection has been considered to be "in the public interest" and external to private life. Governments have assumed principal responsibility for assuring environmental management, and have focused on creating and preserving a safe environment. They have directed the private sector to adopt environmentally sound behavior through regulations, sanctions and occasionally, incentives. When environmental problems have arisen, the public sector has most frequently been responsible for mitigation. In this approach, unrestricted private sector behavior has been considered as presenting the "environmental problem." However, the roles of sectors have been changing, with the private sector becoming active partner in environmental protection. Many governments and businesses are now realizing that environmental protection and economic growth are not always in conflict. Since the Brundtland Report was published, business and management scholars have been grappling with the question of how and why corporations should incorporate environmental concerns into their own strategies. Today many companies have accepted their responsibility to do no harm to the environment. An earlier emphasis on strict governmental regulations has ceded ground to corporate self-regulation and voluntary initiatives. Nowadays, corporate environmental responsibility is defined as the duty to cover the environmental implications of the company's operations, products and facilities; eliminate waste and emissions; maximize the efficiency and productivity of its resources; and minimize practices that might adversely affect the enjoyment of the country's resources by future generations. In the emerging global economy, where the Internet, the news media and the information revolution shine light on business practices around the world, companies are more frequently judged on the basis of their environmental stewardship. Partners in business and consumers want to know what is inside a company. This transparency of business practices means that for many companies, CSR, is no longer a luxury but a requirement.

Key words: *corporate social, environmental responsibility, environmental impact assessment*

## DEVELOPING BEST MANAGEMENT PRACTICES FOR BIODIVERSITY CONSERVATION IN THE MINING INDUSTRY

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As part of The IUCN/ICMM Mining and Biodiversity Dialogue, launched at the Johannesburg Summit in 2002, , a workshop held in Gland in summer 2003 permitted to develop best practice guidance and reporting criteria in the area of Biodiversity assessment and management . Draft operating principles were developed in three areas (i.e., Integrating Biodiversity into Environemtal Impact Assessment; Integrating Biodiversity into Environmental Management Systems and Community Development programs). Next steps in 2004will be to refine the principles, identify performance criteria and develop guidance on implementation. This presentation will describe in more details some of the key aspects identified by the working group in the integration of Biodiversity into EIAs.

## FACILITATING SUSTAINABLE DEVELOPMENT IN DEVELOPING COUNTRIES THROUGH IMPROVING LINKAGES BETWEEN ENVIRONMENTAL ASSESSMENT AND MANAGEMENT TOOLS: A CASE STUDY FROM THE COEGA INDUSTRIAL DEVELOPMENT ZONE AND PORT, SOUTH AFRICA

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The Coega Industrial Development Zone (IDZ) and associated deepwater port in South Africa is a large-scale greenfields development aimed at promoting economic upliftment. Since the initiation of the IDZ and port in the mid-1990s, environmental considerations have been included in the planning and design. These include a Strategic Environmental Assessment and overall Environmental Management Planning for the IDZ and Port, as well as several Environmental Impact Assessments and Environmental Management Plans for specific projects. These environmental assessment and management tools used are generally well established internationally and have been used regularly in South Africa. But how effective have they been at Coega?

This paper presents a review of the effectiveness of these tools in facilitating sustainable development at Coega. The review is based on a series of interviews conducted with key stakeholders from government, business and non-governmental organisations; as well as available documentation. A key finding is that the poor links between environmental assessment and management tools, as well as between these tools and decision-making processes, are key factors limiting the ability of these tools to promote sustainable development. Recommendations are made to improve the links between the outcomes of these tools and decision-making processes; to promote better links between the various tools; and to enhance the communication of findings in a way that is understood and acted upon by all stakeholders. Further recommendations are also made regarding additional tools that could be applied at Coega.

Key words: *effectiveness, environmental assessment and management tools, coega industrial development zone, sustainable development*

## THE IMPOTENCE OF CUMULATIVE EFFECTS ASSESSMENT IN CANADA: AILMENTS, AND IDEAS FOR REDEPLOYMENT

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Cumulative effects assessment (CEA) is by now an integral component of many environmental impact assessment (EIA) processes. In Canada, CEA is a requirement under the Canadian Environmental Assessment Act. We have followed the conceptual, regulatory and practical development of CEA since the early 1980s. Our experiences lead us to the conclusion at this time that the promise and the practice of CEA are so far apart that continuation of the kinds and qualities of CEA currently undertaken in Canada is doing more damage than good. In this paper, we explain how and why, and propose some redirections for practice that would bring it at least toward the promises. Topics covered include (a) the problem of applying CEA concepts in project EIA; (b) a focus in EIA on project approval; (c) inability to address impact significance and thresholds; (d) the inappropriate separation of cumulative effects from project-specific impacts, (e) weak interpretations of cumulative effects, and (f) trivial attention to future developments. If these problems are not addressed and CEA improved dramatically in the near future, there is little hope that CEA can live up to its potential of serving the cause of sustainable development and ensuring the sustainability of valued ecosystem components. We call for revolutionary change, not evolutionary and marginal improvements.

Key words: *environmental impact assessment, cumulative effects assessment, impotence, improvements*

## ENVIRONMENTAL IMPACT ASSESSMENT AND FOREST MANAGEMENT IN CANADA: CURRENT AND FUTURE RELATIONSHIPS

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As a process for advising decision-makers of the potential environmental consequences of human undertakings, one would expect the environment impact assessment (EIA) process in Canada to have application to all undertakings that can have significant environmental impacts. The management of renewable natural resources - as in agriculture, forestry, and fisheries - does indeed involve actions that can have large impacts on both biotic and abiotic valued ecosystem components. Take forest management as an example. Activities that can alter forest structure and composition - key components of terrestrial habitat - include timber harvests, site preparation, regeneration, protection from fire, insects, diseases, and competition, and other treatments which have both individual and cumulative effects.

In this paper, I explore how the EIA process is applied in Canada's forest sector. Since the provinces have jurisdiction under the Constitution Act for forests on Crown land, the focus will be on provincial EIA processes. Application of EIA provisions to forest management is rather inconsistent across the country, where some provinces apply the provisions fully and others not at all. Three cases are analyzed to show how forest managers have responded to EIA requirements. I conclude with an examination of the role of EIA in the context of a suite of other mechanisms (e.g., environmental regulation, certification) used in Canada to make sure that forest management is carried out in an environmentally responsible way.

## AN EXAMINATION OF MOVEMENT ALONG SCOTLAND'S PATH TO SUSTAINABLE DEVELOPMENT : ENVIRONMENTAL MANAGEMENT SYSTEMS, INDUSTRIAL SYMBIOSIS AND THE LACK OF INCORPORATION OF SUSTAINABLE DEVELOPMENT POLICIES WITHIN GOVERNMENT DEPARTMENTS AND THE ENTERPRISE NETWORK

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The newly devolved parliament in Scotland has adopted a prima facia environmental stance with the current First Minister espousing on the world stage, the need for environmental justice at the recent World Summit in Johannesburg alongside the incorporation of policies on sustainable development within the Scottish Parliament's own legislative platform with an outline series of 24 headline indicators (Scottish Executive, 2002).

A pivotal role in promoting and helping to deliver sustainable development in any nation is given to the corporate sector as this is the sector most concerned with resource use and in effect the internalisation of externalities. A number of firms are illustrating this commitment through adopting environmental management systems, either ISO14001, EMAS or indeed the new British Standard BS8555 (www.dti.gov.uk/sustainability).

This paper examines the current state of greenness of the corporate sector in Scotland and its potential to progress the environmental agenda. The study measures the adoption of the various formal environmental management systems (EMS) within the corporate sector and maps the rates of take-up throughout the Scottish Enterprise Network. This take-up is seen as a proxy for greenness within each local enterprise area. The initial results indicate a low take-up and the tentative conclusion suggests there may be a lack of environmental commitment amongst Scotland's companies. However, the existence of EMS are not necessarily a good indicator of environmental commitment. A new proxy has entered the Sustainable Development measurement arena, industrial symbiosis amongst Scottish firms.

The second part of the paper draws upon a recent study which examined the application of symbiotic relationships among a series of 50 projects throughout most of Scotland (excluding Highlands & Islands). These projects were deemed to add to or likely to add to improved resource efficiency and / or provide new products from waste. Mapping these projects by local enterprise company only slightly changes the green hue given by the EMS maps above.

The paper therefore argues that whilst central government departments throughout the UK are failing to incorporate sustainable development policies within their operations (Select Committee, Environment, 2003) that this is also the case with the Scottish Enterprise Network and until such times as this is rectified then a holistic approach to economic development coupled to both environmental and social benefits will mean that sustainable development will remain potentially a 'step too far' for Scotland.

Key words: *environmental management systems, ISO 14001, EMAS, BS8555, industrial symbiosis, sustainable development.*

## DEVELOPING BEST PRACTICES OF EIA FOR THE OIL AND GAS SECTOR: THE NEED AND IMPORTANCE OF CLOSER COOPERATION BETWEEN CANADA AND KUWAIT

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It is no secret that the oil and gas sector is one of the key engines for driving the global economy. Consequently, adequate exploitation of current oil and gas reserves and ongoing exploration to discover additional such resources for future use is fundamental for ensuring economic growth to improve quality of life of people around the world.

It is fair to say that the oil and gas industry is fully cognizant of its responsibility to plan and implement all its programs and activities in an environmentally and socially responsible fashion. The industry is highly committed to conduct its business in a fashion which leads to prudent and sustainable use of earth's dwindling natural capital.

The industry is investing considerable financial and human resources to address human health, safety and environmental issues associated with all phases of its operations and exploration. This high level of investment is a good reflection of industry's resolve to conduct its business in a highly responsible manner.

The industry values EIA as a useful tool of integrated planning so essential for natural resource sustainability. Consequently, it is totally committed to meet all EIA related legal and regulatory requirements in the best possible fashion. Obviously, in this technological age and internet economy, the industry as well as governments are very keen to make EIA processes and procedures more focused, efficient and cost-effective

Recognizing that EIA processes, procedures and practices are in the initial stages of development and the accumulated corporate memory so far remains shallow and inadequate, the industry recognizes the need for additional efforts to develop best sector-specific EIA practices.

It is generally recognized that one of the most efficient and economic ways for doing so is mutual exchange of EIA related experiences and expertise with the oil and gas sector in other countries.

The development and efficient operation of oil and gas industry require huge investment of funds, expensive technology and highly skilled work force. The procurement of needed funds, technology and equipment and qualified manpower is a very expensive and time-consuming process. Consequently, a healthy growth of oil and gas sectors in Canada and in Kuwait requires that EIA related requirements should be met in a timely, efficient and above all cost-effective manner. This is essential to get the regulatory approval and to make key decisions for starting the ball rolling.

In this paper, the authors will attempt to provide an overview of the key environmental and social issues raised and dealt with by the Kuwaiti oil and gas sector during the EIA process. A few selected case studies from Canada and Kuwait will be analyzed for highlighting main approaches for predicting environmental and related social impacts and for determining their socio-economic significance.

The paper will also include some specific conclusions and suggestions for expanding and enhancing cooperation between the oil sectors of Canada and Kuwait and perhaps the Gulf Region countries for improving the relevance, efficiency and cost-effectiveness of assessment procedures and practices.

Key words: *EIA best practices, oil and gas sector, sector-specific eEIA, impact prediction methodologies, mitigation, effects monitoring.*

## LESSONS LEARNED FROM THE EXPRESS PIPELINE PROJECT: THE PERSPECTIVE FROM THE NATIONAL ENERGY BOARD OF CANADA

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The Express Pipeline is a 1,256 km crude oil transmission system owned and operated by Terasen Pipelines Inc. (the Project). The Canadian portion of the Express Pipeline, from Hardisty to Wild Horse, Alberta (approximately 435 km), is regulated by the National Energy Board (the Board; the NEB), the Canadian federal agency that regulates the construction and operation of interprovincial and international pipelines according to several pieces of legislation, including the National Energy Board Act (the NEB Act) and the Canadian Environmental Assessment Act (the CEA Act).

As part of the review of the proposed Project, a Joint NEB/CEA Agency Panel convened a public hearing to evaluate predicted environmental effects, mitigation measures and monitoring programs. In their final report (May 1996), the majority of the Joint Panel members set out recommendations for the construction and operation of the Project, should it be approved by the Board. In June 1996, the Board approved the Project, adopting all of the Joint Panel's recommendations as conditions of the Project's construction and operation.

The purpose of this paper is to examine the practical implementation of the conditions pertaining to environmental issues and predicted environmental effects, particularly those relating to monitoring and follow-up. The following questions were considered:

- How effective were the proposed mitigation, monitoring, and follow-up measures?
- How did the performance of these measures in the field compare to the predictions made in the original environmental assessment?
- How can the Board apply these lessons on subsequent projects in the context of improving environmental assessment predictions, improving the selection of mitigation measures, and advancing the design of follow-up and monitoring programs?

## IMPLEMENTATION OF THE EUROPEAN SEA DIRECTIVE FOR ENGLISH TRANSPORT PLANS

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In England, each Local Highways Authority has a statutory duty to prepare a 5-year local transport plan (LTP) according to the Transport Act 2000. The first full LTPs were submitted to Government 31 July 2000. Prior to the adoption of European Directive 2001/42/EC on the assessment of the effects of certain plans and programmes on the environment (referred to as the SEA Directive), LTPs were required to undertake an assessment of the extent to which they performed against the UK Government's five overarching objectives for transport (accessibility, safety, economy, environment and integration).

The environmental appraisal (EA) was thus one of five strands of the appraisal undertaken for English LTPs. The next round of LTPs is due by 31 July 2005, and will require a strategic environmental assessment (SEA) according to Directive 2001/42/EC.

This paper explores the practice of EA for the first round of English LTPs, and compares aspects of existing practice with certain requirements of the SEA Directive. The main focus of the paper is on quality control, monitoring, and integration into decision-making. Aspects of existing practice that have been examined include the extent to which environmental information is provided in EA/LTP documentation, the degree of influence of the EA on plan preparation, the extent and nature of environmental monitoring, and the use of EA/monitoring results and data. The paper also examines local planning authority views on how some of the challenges in melting the SEA Directive's requirements may be addressed.

Key words: *SEA directive, English transport plans, monitoring, quality control, decision-making*

## EFFECTIVE SOCIAL IMPACT ASSESSMENT MUST BE INTEGRATED INTO ENVIRONMENTAL IMPACT ASSESSMENT SYSTEM IN THAILAND - LESSONS LEARNED FROM HIN KRUT COAL-FIRED THERMAL POWER PLANT AND BO NOK POWER PLANT

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Even though environmental impact assessment (EIA) system has been established in Thailand more than 20 years, criticisms have been made frequently concerning ineffectiveness of the system. Some of the major obstacles to the system are the weaknesses in assessing social concerns and neglect of people involvement. These lead to several severe protests and disapproval of the projects. This paper tries to illustrate the shortcomings of the social impact assessment (SIA) and public participation processes especially on legal, institutional, and procedural aspects through the cases of Hin Krut Coal-Fired Thermal Power Plant and Bo Nok Power Plant Projects proposed at the sites of Prachuab Kirikhan province. Recommendations concerning those aspects and how to integrate effective SIA within EIA process will be made accordingly.

Key words: *social impact assessment, environmental impact assessment, Thailand*

## CEAA, A CHALLENGE TO CONTINUAL IMPROVEMENT: ONE INDUSTRY'S EXPERIENCE

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CEAA, as it stands today, presents challenges to obtaining environmental approvals and implementing continual improvement projects, especially at the determination and screening levels. These challenges arise from: a structural emphasis within the act and regulations on perceived versus real risk to the environment; a multiplicity of public consultation that fails to find a balance between timeliness, the public's need to know, and the Responsible Authority's legislated public consultation requirements; the wide and often overly precautionary interpretations of the act; and an apparent emphasis on process over substance, especially when projects are low risk or are demonstrably better for the environment than the current situation. As such, CEAA fails to efficiently incorporate the current state of environmental assessment knowledge and regulatory process. It is the experience of Cameco Corporation, a uranium mining and energy company, that CEAA presents significant challenges to continual improvement by failing to recognize that large companies and corporations are highly self-motivated towards sustainable development and the need to maintain our social license to undertake industrial activities. Such companies, working in a highly competitive global environment, require timeliness in EA decisions to participate effectively in that economy. It has been our experience that highly variable interpretations of the act and its regulations, coupled with the fear of litigation, have created a climate whereby the environmental assessment process has become virtually paralysed. The process for a screening under CEAA has, for our industry become relatively inflexible and process focused, more akin to a comprehensive study, consuming valuable time and resources with little apparent value added. The net effect is long approval times for small low-risk projects, or potentially beneficial projects, which are being caught up in a one-size fits all approach to applying CEAA. Even large projects are taking an inordinate amount of time to go through the EA process. CEAA, to be effective, must be managed to provide both adequate and timely assessments, which strike an informed balance between real risk, public consultation and process. If so managed, CEAA could be an efficient tool for promoting, rather than hindering, sustainable development, contributing positively to the viability of industry, while at the same time demonstrating environmental protection. For a screening level assessment under CEAA, we believe that there is an opportunity to apply risk-based principles to the EA process in order to achieve significant improvements to the timeliness of EAs and project approvals. Our paper will discuss how we are meeting the challenges of the current situation, and what we see as the path forward.

## SIA AND THE MINING INDUSTRY: EVOLVING EXPECTATIONS

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Private sector investors who want to develop resource-based projects are required to follow precise permitting procedures determined by the regulators. Government requires that an environmental assessment be conducted which ensures that a defined process is followed so as to predict the environmental and social effects of proposed initiatives before they are implemented. Social impact assessments (SIAs) allow for the identification of possible negative effects as well as formation and selection of project implementation activities that can contribute to sustainable development by introducing measures which ensure negative impacts are avoided or mitigated. When required or appropriate, an environmental monitoring program is designed and implemented to verify that the environmental impact assessment was accurate as well as to determine performance and effectiveness of the mitigation measures. Although follow-up monitoring is an accepted practice in the environmental assessment process, it is at the nascent stages in the private sector. For the International Financial Institutions (The World Bank, Asian Development Bank, African Development Bank, etc.) and bilateral aid agencies (CIDA, USAID, DFID, etc.), project evaluation is a widely accepted and well-defined practice which, when conducted at the mid-term review stage of a project, can provide valuable results-based operational lessons so that adjustment can be made to strategy, structure and methods of implementation if appropriate and/or feasible. This paper will discuss moving beyond SIA follow-up monitoring to incorporate more formalized evaluation techniques which measure project mitigation implementation in terms of their relevance, efficacy, impacts, sustainability and, where appropriate, efficiency. Examples will be drawn from the mining sector.

Key words: *environmental assessment, social impact assessment, follow-up monitoring, evaluation*

## THE CANADIAN ENVIRONMENTAL ASSESSMENT ACT REGISTRY INTERNET SITE: PROVIDING FOR MORE MEANINGFUL PUBLIC PARTICIPATION

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The purpose of this paper will be to discuss the establishment of a new on-line registry for environmental assessments conducted under the Canadian Environmental Assessment Act and the role that this Registry Internet Site is playing in providing for more meaningful public participation in environmental assessments.

During the recent legislative review of the Canadian Environmental Assessment Act, it was determined that one of the main difficulties for the public in participating in environmental assessments was the fact that it was difficult to be notified in a timely manner of what environmental

assessments were being conducted. In addition, even when the public was aware of an environmental assessment, it was sometimes difficult to obtain information early enough during the process to participate effectively.

In response to these difficulties, the Government of Canada proclaimed on October 30, 2003 amendments to the Canadian Environmental Assessment Act that established a new Registry Internet Site. The Registry Internet Site provides for timely notification to the public of when environmental assessments are initiated and includes key records related to the assessment with contacts for how additional information can be obtained.

Departments have started promoting the use of the Registry Internet Site to their stakeholders as a means for monitoring environmental assessments. In particular, the use of on-line maps has made it easier for the public to see what projects are occurring in their region. In the future, there is potential for the Registry Internet Site to be improved so as to further promote public participation in environmental assessments. For example, the Registry Internet Site could be expanded to include on-line consultation mechanisms where the public can post comments on an environmental assessment directly to the Registry Internet Site and then review comments made by other parties.

Key words: *public participation, public registry, information technology (IT) system*

## FROM POLICY TO PRACTICE: RECENT DEVELOPMENTS IN THE EVOLUTION OF POLICY ASSESSMENT AT THE FEDERAL LEVEL IN CANADA

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At the federal level, Canada has had a strategic environmental assessment requirement in place since 1990. In 1999, following a critical assessment of federal implementation of the requirement, the federal government put in place new guidance, the 1999 Cabinet Directive on the Environmental Assessment of Policy, Plan and Program Proposals. Since 1999, strategic environmental assessment, as an aid to federal decision making, has markedly improved, both in terms process and practice.

In March 2004, the Canadian federal government hosted the first ever federal workshop on strategic environmental assessment with a view to examining three key questions:

1. What are indicators of good strategic environmental assessment processes at the federal level?
2. What are indicators of good strategic environmental assessment practice at the federal level?
3. What additional work is required to foster the use of strategic environmental assessment by federal organizations?

Workshop participants were engaged in a number of case studies to examine the issue of process and practice, with a view to identifying those factors that characterize good process, and in terms of analysis, those factors that characterize a thorough strategic environmental assessment. This paper/presentation will examine the process used to bring the federal community together to develop workshop content, and provide information on the results of the deliberations during the event. It is expected that the information generated during this session in Canada might have broader applicability among governments and organizations working to incorporate policy assessment into their operations.

Key words: *strategic environmental assessment; policy assessment*

## INCORPORATING CLIMATE CHANGE CONSIDERATIONS IN ENVIRONMENTAL ASSESSMENTS

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Climate change has been recognized by all levels of government, and increasingly the public and other stakeholders, as an important environmental issue requiring coherent and effective action. Environmental assessment (EA) has the potential to link project planning to the broader policy development and management of climate change issues. Furthermore, the consideration of climate change is not explicitly identified as a factor to be examined in Canadian EA legislation. Climate change in project EA has been inconsistent. This paper introduces the recently released guidance document entitled, Incorporating Climate Change Considerations in Environmental Assessments: General Guidance for Practitioners, developed by the Federal-Provincial-Territorial Committee on Climate Change and Environmental Assessment. Having benefited from an open and collaborative process involving federal, provincial and territorial co-developers, as well as consultations with jurisdictions and stakeholders, this document is a unique and timely initiative with important implications for government decision-makers, project proponents and practitioners. It is a useful resource for the effective incorporation of climate

change considerations in project EA, focusing upon project greenhouse gas emissions and the impact of climate change on projects over time. It is intended to stimulate the consideration of less emission-intensive ways to design and operate projects, while helping proponents manage or reduce the potential risks associated with climate change impacts, and assuring the public and other stakeholders that climate change considerations are being addressed. This presentation will address the development of the guide, its general contents and suggested methodology.

Key words: *climate change; emissions; impacts; guidance; practitioners*

## NATURAL GAS PIPELINE ROUTE SELECTION OFFSHORE NOVA SCOTIA AS A MITIGATION STRATEGY

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Blue Atlantic Transmission System (Blue Atlantic), a subsidiary of El Paso Corporation (El Paso), is proposing to build a natural gas pipeline system known as the Blue Atlantic Project to transport and process gas from future gas developments offshore Nova Scotia, Canada. The Blue Atlantic Project would include construction and operation of: a new subsea gathering pipeline to collect raw gas on the Scotian Shelf and transport it to shore in Nova Scotia for processing; a gas processing plant to be located in Shelburne County, Nova Scotia; and a new subsea transmission pipeline to transport the processed gas across a portion of the North East Continental Shelf to a landfall in the New York /New Jersey area. The Canadian portion of the Project will require an environmental assessment under the Canadian Environmental Assessment Act (CEAA). Any new industrial activities off the coast of Nova Scotia will be of interest to other marine resource users, particularly the fishing industry. Likewise, a gas plant, onshore pipelines, and associated facilities are of prime interest to local residents. One of the first and most important steps in the project planning process was the preliminary selection of a site for the processing facility and a route to the offshore for the subsea pipelines, with due regard for the local public, sensitive species/habitats, geotechnical constraints, and fishing activities. Blue Atlantic personnel met with fishing industry representatives and other stakeholders to solicit input into the onshore site and offshore route selection process. This paper describes the iterative process of project site and route selection, a key part of the environmental impact assessment mitigation through: market analysis and strategy, stakeholder consultation; socioeconomic consideration, resource mapping; constraint identification; GIS database management; geophysical surveys; biological sampling; computer modeling; and multimedia presentation.

Key words: *pipeline route selection, impact mitigation, offshore pipelines, oil and gas industry, fisheries.*

## PROMOTING SUSTAINABLE INFRASTRUCTURE DEVELOPMENT IN CANADA: CONSIDERATION OF THE MANAGEMENT OF EFFLUENTS IN MUNICIPAL WASTEWATER PROJECTS FUNDED BY INFRASTRUCTURE CANADA

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Developed and developing countries, including Canada, face growing pressures to renew and expand public infrastructure, such as transit, water and wastewater treatment, solid waste disposal, buildings and amenities. For infrastructure development to fully contribute to improved quality of life and economic prosperity, it must be based on principles of environmental sustainability.

Infrastructure Canada, a recently created department of the Government of Canada, manages several national programs that deliver billions of dollars in new investment for

sustainable economic growth in urban and rural communities across the country. Municipal wastewater collection and treatment systems are among the eligible project categories under the Canada Strategic Infrastructure Fund and the Municipal Rural Infrastructure Fund administered by Infrastructure Canada.

Based on the outcome of risk assessments conducted under the Canadian Environmental Protection Act, 1999, the Government of Canada intends to more actively promote the management of municipal wastewater effluents, based on pollution prevention planning and national standards managed through harmonized regulatory regimes. The Canadian Council of Ministers of the Environment is currently considering the development of a Canada-wide strategy and measures to ensure that municipal wastewater effluents do not pose unacceptable risks to citizens and the environment. The paper reports on these developments and proposes an approach for assessing municipal wastewater project to ensure that proposals receiving federal support are properly aligned with the Government's environmental sustainability objectives for this sector.

Key words: *infrastructure, municipal wastewater, environmental sustainability, Government of Canada, Infrastructure Canada, Canadian Council of Ministers of the Environment*

## CHALLENGES IN THE USE OF TRADITIONAL KNOWLEDGE IN EIA

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Traditional Knowledge (TK) is commonly used to refer to a system of knowledge, values and beliefs passed across generations. An increasing number of formal mechanisms require or promote the consideration of TK in Environmental Impact Assessment (EIA) in Canada, and this has been reflected in the assessment of several major proposed projects.

The inclusion of TK in EIA poses several challenges to those compiling EIA documents, as well as to bodies conducting the EIA review. This paper describes how TK can be integrated into various stages of EIA, and explores some of these challenges to doing so, based on the first hand experiences of the authors.

- Because TK is area specific, TK holders are often from potentially affected communities with an interest in the outcome of the EIA. This raises questions of bias, particularly where there will later be financial compensation related to impacts.
- There are important differences in between community based knowledge and TK. These affect the way each is considered in EIA. Separating these two related forms of knowledge so that they can be best applied is a challenging task.
- Although many TK holders are elders, not all elders are TK holders, and not all TK holders are elders. Just as the credentials of scientific authorities are examined in the hearing, so should the credibility to TK holders.
- TK testimony and evidence in EIAs can conflict with other TK evidence. In such a situation, it is difficult to weigh evidence adequately.

Key words: *Traditional Knowledge, aboriginal, First Nations*

## CREATING MORE ADVANCED ENVIRONMENTAL GUIDELINE OF THE JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)

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The Japan International Cooperation Agency (JICA) is the major organization for Official Development Assistance (ODA) in Japan. It has three functions of assisting the planning process of big projects, making gifts for projects, and technology transfer to developing countries. It has a big role for assisting studies for planning big projects supported by official loans of Japanese government. It, therefore, is required to make enough considerations to environmental and social impacts caused by its activities. JICA has already a series of guidelines for this purpose which were made in the early part of 1990s. By strong requirement from the Japanese Diet for revolution of the Ministry of Foreign Affairs, JICA started to revise the environmental guidelines. The new guideline is overall one. And it is fairy high level for sustainable development by requiring good practice of EIA. For instances, it requires three time public consultation though the world bank requiring two times, very positive information disclosure, and introduction of Strategic Environmental Assessment. It will be established in April 2004 and implemented at the same time. The author, as the chairman of the committee, analyses the characteristics of the guideline and the reason why such advanced one was made. The process of creating it was a very transparent. Every major stakeholders were collected into the study committee including not only academics but also the representatives from major ODA related governmental bodies, NGOs, and consultants. Every meeting was open to the public and minutes of the meetings were appeared on

the web site. Various opinions were always collected and put into the committee. After the committee report was made, JICA made the draft of the guideline. It held also several public consultation forums, then. Public comments were collected. The very transparent process made it possible to achieve a high level guideline.

Key words: *EIA, environmental guideline, sustainable development, public involvement, JICA, ODA*

## STRATEGIC ENVIRONMENTAL ASSESSMENT APPROACH FOR CONSENSUS BUILDING OF REGIONAL WASTE MANAGEMENT - A CASE STUDY IN NAGANO PREFECTURE, JAPAN

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Waste management is one of the major topics for creating sustainable society. There are many disputes of construction of waste treatment plat in all over the world. Those are one of NIMBY problems. The public involvement process has not been good in Japan because of the insufficient democratic system. But this situation has been changing recently. This is a case happened in Nagano Prefecture in the central part of Honshu Island, the biggest Island in Japan. The prefecture is located in a very mountainous region with natural beauty. The prefectural government planned to construct a combination of a waste treatment plant and a landfill site in a small town for the waste management of the region. Though it conducted project EIA, the local residents claimed that the site location process was not transparent. A big dispute arose. The new governor was elected in the autumn of 2000, and he heard the voices of the people. As he realized that true public involvement process was necessary, he asked the author to resolve the dispute. The approach of consensus building for this was a kind of an application of the concept of strategic environmental assessment. The dispute was arisen at the final stage of the series of decision making from policy making to project implementation. For public involvement, public should be involved from the start of policy making stage. The author has a theory of good public involvement. It has three requirements of configuration of the consensus building arena, high level openness of the arena, and supply of sufficient information necessary to solve the problem. It was realized in the case. They could build step-wise consensus until finding 85 candidate sites for location. Though the dispute is still continuing, they are making steady steps towards the final settlement.

Key words: *strategic environmental assessment, waste management, consensus building, public involvement, Nagano Prefecture*

## USING LIFE-CYCLE IMPACT ASSESSMENT TO ASSESS ENVIRONMENTAL PERFORMANCE IN THE ELECTRICITY SECTOR: CASE STUDIES IN CANADA AND THE US

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In response to concerns about the environmental impacts associated with the electricity sector, a number of initiatives have emerged to promote "green" power. However, while there is a general consensus regarding the need to reduce the environmental footprint of electricity, there is by no means a consensus on the best approach toward achieving this goal, or even on the definition of what is "green." A variety of green power definitions and initiatives have been put forward, often reflecting conflicting perspectives and criteria

To settle the question of what is "green," energy companies, policymakers and customers need a consistent, scientific tool to analyze the relative environmental impacts of various power generation technologies, efficiency upgrades, transmission options, and conservation strategies. Such a tool is needed to compare the relative merits and disadvantages of options on a transparent, systemwide basis and to determine which options represent the lowest environmental impacts, offer the greatest reliability, and represent the best use of economic resources.

Life-cycle impact assessment (LCIA), standardized internationally (ISO-14042), satisfies this need. LCIA is, a system-based data integration and analysis approach that takes into consideration the type of fuel source utilized, and the environmental, technological, and operational variables that influence the nature and scale of environmental impacts.

Scientific Certification Systems has conducted several LCIA studies in the US and Canada, assessing a wide range of electricity generation systems. These studies have shed light on some of the most controversial subjects in the green power arena. Several case studies will be discussed. In addition, SCS has established the first technical standard for certifying environmentally preferable power based on the ISO-14042 standard. This standard is technology-neutral, transparent, and addresses the full spectrum of relevant environmental impacts. It can also be used to support impartial evaluation of existing green power programs in Canada and the US.

Key words: *life-cycle assessment, Life-Cycle Impact Assessment, LCA, ISO-14042, environmentally preferable power, green power, EPP, certification, low impact power*

## CIPEC: TOOLS FOR IMPACT ASSESSMENT

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Launched in 1975, the Canadian Industry Program for Energy Conservation (CIPEC) has been a key element of the Canadian government's industrial energy efficiency efforts. Under the auspices of Natural Resources Canada, CIPEC provides provides a focal point for a joint industry/government voluntary alliance to increase energy efficiency, limit emissions of energy-related greenhouse gas emissions and increase economic competitiveness. Key program outputs include energy efficiency improvement targets and action plans to achieve these targets at a sector and sub-sector level. Through a network of 26 sector task forces supported by 45 related vertical trade associations, CIPEC provides Canadian industry with access to services designed to reshape and/or reduce marketplace barriers to the implementation of energy efficiency practices and programs within their respective organizations.

## CLIMATE CHANGE IMPACTS ON ELECTRIC AND NATURAL GAS UTILITY ASSET OPERATIONS AND COSTS

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This paper will demonstrate the practical value of applying climate science and modeling to electric and natural gas utility load and energy forecasting, and then applied to utility asset planning over a long term. The study is based on an earlier completed san diego regional energy infrastructure study, which was completed in january 2003. The study reports on the completion of a long-term climate forecast and identifies the seasonal temperatures and precipitation variations for a 30-year period. Then, the seasonal temperature changes are applied to electricity and natural gas energy forecasting and infrastructure planning.

The study found that seasonal climate change represents anywhere from 1oC-1.5 oC impact on the winter or summer load forecasts for electric and gas utilities. The increasing temperatures will have variable impacts on electric and natural gas infrastructure for San Diego County. The changes are likely to have a more gradual long-term impact affecting the infrastructure investment level and asset base in San Diego County as well as in the average yearly-monthly-daily operations of the energy assets. The historical analysis found significant near term annual behavioral impacts on electricity consumption due to price, behavior and weather. The regression models that were constructed controlled for price, customer education and other factors. Climate-induced temperature change was found to lower winter gas heating requirements and increase summer electric load requirements - more so for the residential market than commercial market. The impact of temperature increases took into account pricing, market growth, efficiency and other market responses. Weather demand impacts range form just a few MW for the commercial market to over 300 MW variations for the residential market. Additional impacts on both average annual seasonal demand for natural gas for the residential and commercial markets as well as for the maximum peak sendout for natural gas. The regression models developed were statistically significant.

A final major finding of the project was the incidence of extreme weather conditions in Southern California are expected to increase which will make peak day planning extremely important for both reliability and cost savings.

## ECONOMIC IMPACTS OF IMPROVED HOURLY TEMPERATURE FORECASTS FOR ELECTRICITY GENERATORS

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Localized or mesoscale weather conditions can have major effects on the accuracy of hourly load forecasts of electricity usage. These localized conditions can include "sea-breezes," local valley or mountain breezes, lake breezes, or in some cases "urban heat islands." Such weather conditions can give rise to transient localized decreases in temperature, humidity, and wind speed. As a result, electricity forecasts utilizing regional weather forecasts based on synoptic conditions such as high-level wind flows and regional atmospheric pressure conditions will be in error. Some of these errors may be small on a daily basis, but when viewed cumulatively over a year, can result in a substantial economic loss to electricity generation firms. Other errors resulting from weather extremes produce even greater load forecasting error. Economic losses can result from the need to purchase higher marginal cost supplies, or even result in rolling blackouts to cover shortages in extreme situations.

In a case study on the central valley of California, we estimate the economic impacts of improved localized weather characterization on electricity load forecasts. The Central Valley is subject to several different weather regimes

characterized by differences in wind speed, temperature, and sea level pressure on any given day. At least one of these weather regimes results from a highly unpredictable "sea breeze" subject to topography and synoptic conditions. To illustrate the consequences of a miss-forecast of temperature in this regime, this particular phenomenon has resulted in a $1 million loss from generation shortfalls that had to be covered in the market. This picture is further complicated by interactions between this regime and other weather regimes in the Central Valley.

Using an econometric load model we evaluate the effects of these different weather regimes in a spatial context. Our analysis indicates that improvements in hourly temperature forecasts, and better characterization of localized weather regimes will lead to a decrease in errors in electricity forecasts for the area. We estimate the potential economic gains from improved forecasts, and suggest that substantial benefits can be gained through improving the accuracy of hourly temperature forecasts, and a better representation of local weather in a load-forecasting framework.

## LEVERAGING THE INFORMATION IN ENSEMBLE WEATHER FORECASTS FOR MORE RELIABLE RENEWABLE ENERGY GENERATION

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The reliable allocation of future generation from many sources of renewable energy is currently hindered by the weather dependence of those sources. Wind energy is a prime example where dependence on either climatology or traditional single "best guess" weather forecasts may introduce unexceptable variations between expected (allocated) generation and that delivered. The requirement of maintaining warm reserve (or even spinning reserve) using traditional power plants can significantly impact the goals which originally motivated the move towards renewable supply.

Operational ensemble weather forecasts have been available from both the National Centers for Environmental Prediction (NCEP) and from the European Center for Medium Range Weather Forecasting (ECMWF) for over a decade now. In this contribution, we will investigate different strategies for extracting the information in these ensemble forecasts and using it in the context of wind energy generation.

Following Roulston et al (M. S. Roulston, D. T. Kaplan, J. Hardenberg & L. A. Smith (2003) Renewable Energy, 28 (2003), 585-602) we contrast the result of planning forward generation based on a variety of operationally available forecasts, ranging from climatology to the full ensemble forecast, in the context of a simplified electricity market. At lead times up to 6 days, production decisions are improved by using forecasts based on the ECMWF ensembles. Applications to other types of plant and to demand forecasting more generally will be noted.

## CLIMATE FORECASTS FOR THE ENERGY INDUSTRY: MOVING BEYOND WEATHER

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The energy industry typically uses weather forecasts to plan operations a few hours to a few days ahead. However, many slower evolving climate phenomenon also have impacts on the energy industry, on timescales from seasons to decades. This presentation will show examples of what climate forecasts are available that can be used by the energy industry, what lead-times and skill they have, and how they are relevant to planning and operational decisions.

The examples will include a characterization of the climate influences on and predictability of the California delta breeze, a cool on-shore wind that sometimes ventilates the California central valley, dropping electrical load by up to 500 MW; an analysis of the predictability of irrigation pump loads in the U.S. Northwest, and the extent to which they are influenced by the previous winter's snow accumulation and spring rainfall; and the prediction of winter seasonal temperature (heating degree days) in Southern California, which is useful for planning natural gas operations.

## THE IMPACT ENHANCED WEATHER DATA AND ASSESSMENT ON THE RISK PROFILE OF THE ENERGY INDUSTRY

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Identifying adverse operational impacts and the controlling of manageable risk is a primary concern of all businesses. The energy sector was one of the first industries to recognize the risks it was exposed to as a result of weather variability, and was largely instrumental in developing 'weather derivatives' as a financial product to mitigate its risks. However, as has recently been demonstrated, enhancing the skill of weather forecasts and reducing load forecast model error, for example, may also result in considerable reductions in risk exposure. Case study investigations undertaken in power generators, distributors, independent system operators and large power users have revealed substantial potential for increasing the accuracy of power demand forecasts and enhancing the efficiency of a number of power sector operations leading to risk reductions.

A number of investigations have recently been undertaken in the United States focusing on the power sector and the use the industry makes of environmental information, in particular weather data. Case studies have examined the characteristics of environmental data inputs such as sources of weather data, resolution, reliability/error values, parameters [temperature, precipitation, humidity], temporal scales, models, and the use of weather data in improving overall performance of the energy sector. Associated with a reduction of risk to the industry, other benefits accrue such as enhanced regional economic performance and competitiveness, energy security, sustainability and corporate responsibility.

The presentation will briefly examine the improvements in the risk profile of energy sector organizations, the impacts of enhanced weather forecast data and better assimilation of the information in energy sector that lead to the better management of risk, with consequential lowering of risk ratings.

## MAINSTREAMING ENVIRONMENTAL FORECAST INFORMATION INTO MANAGEMENT DECISION TOOLS IN THE POWER INDUSTRY

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As the skill of environmental forecast products resulting from enhanced observational technology, modeling and analytical capability improves, so too must the uptake and optimal assimilation of the information into the business tools, practices and policies of the energy industry. Analysis of the decision processes in the power value chain leads to the identification of key areas where environmental forecast information can significantly improve the efficiency, reliability, and cost effectiveness of "vulnerable" business operations such as load forecasting, generation commitment, revenue projections, power pricing, supply chain management, tariff scheduling, asset planning and so forth. New software tools and management strategies can be employed to maximize the impact of the environmental forecast information for a "favorable outcome" of the decision process. Case studies roadmap how environmental forecasts can improve the business forecasts used to inform policy, regional management strategies, market tools and financial planning. From a decision science point of view, organizations can become responsive to managing with environmental information to improve competitive advantage and safety.

## EIA FOR CANADA'S LARGEST GREENFIELD WATER FILTRATION PLANT

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The Greater Vancouver Regional District supplies water to the 2 million residents of the western half of British Columbia's Lower Mainland, which is situated on the west coast of Canada. A number of water quality concerns have led towards the requirement to construct new water filtration plants for two of its sources. The combined capacity of the two plants is 1800 ML/d and will make it the largest water filtration plant in Canada when completed in 2007. The C$600 Million project includes a combined filtration plant, an 1800 hp pumping station, a 2MW energy recovery facility and twin 7 km long tunnels.

Environmental Impact Assessments (EIAs) that included extensive efforts and evaluation of options for siting of the two plants were carried out over a ten-year period. A triple bottom line approach which included social, environmental and economic factors was utilized when considering siting options and technologies for the treatment plants.

The presentation will present the options considered and studies completed on archeological, aquatic and terrestrial environmental impacts, neighbourhood and community impacts, worker safety, as well as, technological and cost issues associated with constructing such a large project.

The GVRD utilized extensive stakeholder involvement during project development which resulted in the host municipality supporting the need for and construction of the project in their backyard. The consultation process, lessons learned and how stakeholder input was used in the "triple bottom line" approach will be presented and discussed.

The outcome of the EIA and final recommendation was a combined filtration plant located in a natural park like area known as the Lower Seymour Conservation Reserve. The mitigation strategies adopted, the environmental and social challenges associated with constructing the plant in the selected location will also be presented.

Key words: *EIA, large infrastructure, stakeholder contultation*

## A COMPARATIVE ANALYSIS OF ENVIRONMENTAL IMPACT ASSESSMENT COAL BED METHANE (CBM) AND STEAM ASSISTED GRAVITY DRAINAGE (SAGD)

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A literature search was conducted to compare and contrast environmental impacts associated with the established environmental impact review process for SAGD projects in northeastern Alberta with emerging development of coal bed methane (CBM) plays in western Canada. The review included an evaluation of activities in the United States and western Canada. Although there are similarities in environmental impacts associated with these oil and gas developments, there are important differences that must be acknowledged in the review process.

Key words: *EIA, large infrastructure, stakeholder consultation*

## WHY STANDARDIZED RISK ASSESSMENT GUIDANCE WITHIN A HEALTH IMPACT ASSESSMENT IS ESSENTIAL TO EFFECTIVE ENVIRONMENTAL STEWARDSHIP OF FEDERAL CONTAMINATED SITES IN CANADA

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Human health risk assessment is a valuable tool within the Health Impact Assessment toolkit. However, risk assessment, whether at the screening level or more complex, is not an exact science. A wide variety of advice and direction is offered by international, national and provincial environmental agencies regarding the conduct of risk assessment. Environmental regulatory agencies across Canada, and those abroad, offer differing guidance on many aspects of risk assessment as well as specifying different levels of risk that are defined as essentially negligible, tolerable or acceptable. Individual risk assessors, often within the same consulting firm, access and rely on the available regulatory advice and direction differently. The resulting variability prevents the effective comparison of risk assessment results from one site to another, complicating the task of identifying and remediating the highest risk sites first. We will review the available evidence on risk assessment variability, including studies conducted specifically for Health Canada, and demonstrate why Health Canada has formalized standard risk assessment procedures for the assessment of federal contaminated sites in Canada.

## GETTING IT RIGHT FIRST TIME: THE SKORPION ZINC PROJECT

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The Skorpion Zinc Project was a green fields development of an open cast zinc mine and refinery in a remote, pristine desert in southern Namibia. The area lies in one of the top 25 global biodiversity hotspots and is the only desert on the list. It also lies in an area that has been recommended for development as a National Park. It was therefore imperative that environmental management at the site should be taken extremely seriously.

Fortunately this was recognised early on when exploration started in 1997, and environmental consultants were appointed to compile an Environmental Management Plan (EMP) for the drilling programme. When the deposit had been confirmed, the consultants completed a comprehensive EIA to World Bank standards, which was backed up with a detailed EMP for construction. The site environmental control officer was one of the first permanent appointments made, and it was her task to ensure that the 4500 construction workforce employees and the dozens of contractors, not to mention the owners and managers of the project, complied with the 160 clauses contained in the EMP. By the end of construction some 2 years later, independent compliance audits found that over 90% of the EMP clauses had been fully complied with and there were no inadequacies recorded. This was achieved through the combination of a number things:

- Full commitment and support from senior management;
- The early adoption of the motto "Get it right first time, every time";
- The development of Environmental Design Criteria that were used by the design engineers as a reference, thereby eliminating many impacts at source;
- The inclusion of the EMP and Code of Conduct in all tender documents;

The culture of care that was instilled in the workforce seemed to carry through to other aspects such as Health and Safety, with the site at one time achieving over 4 million lost time injury-free manhours and no fatalities. This would be remarkable on any construction site, but in such a remote area in such extreme conditions, this was considered to be exceptional.

Getting it right (mostly) first time certainly paid off when the project was awarded the National Premium Award for Excellence in Environmental Management by the South African Chapter of IAIA in September 2003.

## ENVIRONMENTAL ASSESSMENT SYSTEM FOR HOUSING COMPLEX DEVELOPMENT IN KOREA (poster)

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There is EA(environmental assessment) system to achieve ESSD(Environmentally Sound and Sustainable Developement) in Korea. One is PERS(Preliminary Environmental Review System), and the other is EIA(Environmental Impact Aeeseement). The purpose of each system is different. Whereas the purpose of PERS is to decide that the site for project and development plan are appropriate with respect to environment, the main goal of EIA is to reduce adverse impacts resulted from execution of development project. In Korea, many EA for housing complex development has been carried out, and several projects were rejected. Thus, we'd like to introduce methodology for EA for housing complex development. At PERS stage, Geology, flora and fauna, hydrology, land use, air quality, water quality, soil, noise and vibration must be assessed. For example, with respect to geology and hydrology, possibility of occurrence of natural disater like slide and frequent inundation at project site will be examined. When it is expected that natural diaster will happen, the site is not suitable. From the viewpoint of air quality, whether ambient air quality and future air quality(ambient concentration + additional concentration) exceed NAQS(National Air Quality Standards) must be examined. When, ambient air quality exceeds NAQS, the site is not suitable for housing complex development. On the contrary, at EIA stage, meteorology, waste management, landscape and visual impact, transporation, and so on will be added. For example, with respect to meteorology, we recommend that layout of apartment dose not hinder the flow of wind stream. Furthermore, if the project will be built near seashore, the impact on ecology of seashore and ocean must be considered. To save time and cost, impacts assessed at PERS stage do not assess at EIA stage.

Key words: *EA for housing complex development in Korea, PERS, EIA*

## HEALTH AND SUSTAINABILITY: EXAMINING THE POWER OF HEALTH IMPACT ASSESSMENTS WITHIN ENVIRONMENTAL IMPACT STATEMENTS (poster)

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Currently the Texas Program for Society and Health (TPSH) is researching the potential of health impact assessment (HIA) in public policy development to improve population health (Higgins, forthcoming). This research examines HIA as a stand alone policy; however, other research suggests the environmental impact statement (EIS) could carry a great deal of the health impact burden itself. Through a grant from the Shell Center for Sustainability at Rice University, the TPSH is examining the power of health assessment within EIS. This project examines the feasibility of integrating robust assessments of health into the established structure of EIS in the United States. We believe incorporating health into federally mandated EIS could have a more immediate impact on population health. We also believe that by studying this integration, we could create a more complete methodology and strong quantitative measures that could be used in the creation of HIA as a national stand alone policy. Houston, "the energy capital of the world," offers an enormous energy market engaged in active EIS. Our project works with these companies on a local level, examining how public sector policy (EIS) impacts the ability of the private sector to implement a sustainable future in regards to population health.

Key words: *health impact assessment; environmental impact statement; public policy; sustainability.*

## ENVIRONMENTAL ASSESSMENT DURING ROUTE SELECTION FOR TRANSMISSION LINES IN MEXICO (poster)

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Evaluation of project alternatives is one of the most important issues of the environmental impact assessment because it maximizes the benefits and minimizes the environmental costs of a project and it helps to manage the uncertainty. Alternative comparison provides the framework for a decision more than a mere justification of a proposal.

The Mexican Federal Power Company (Comisión Federal de Electricidad) is developing a process for selecting the route for new transmission lines considering social, cultural, environmental and technical issues.

We describe the environmental assessment process of the alternative routes considered for constructing a new transmission line and the procedure for incorporating the result of this assessment into the integrated analysis for selecting the trajectory for developing the project.

Key words: *alternative assessment; environmental impact assessment; transmission line*

## PROMOTING SUSTAINABLE INFRASTRUCTURE DEVELOPMENT IN CANADA: AN EMERGING PROGRAM FRAMEWORK FOR ENVIRONMENTAL SUSTAINABILITY AT INFRASTRUCTURE CANADA (poster)

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Infrastructure Canada, a recently created department of the Government of Canada, manages several national programs that deliver billions of dollars in new investment for sustainable economic growth in urban and rural communities across the country. For infrastructure development to fully contribute to improved quality of life and economic prosperity, it must be based on principles of environmental sustainability.

This poster proposes a framework that is being developed to review and promote environmental sustainability in the selection, evaluation and approval of infrastructure projects for financial support by the department. It advances the position that, for maximum public benefits to be realized from this investment, proposals need to be considered both in respect of potential environmental effects and opportunities for advancing related sustainability objectives. Toward this end, the poster cites a number of sustainability considerations relating to projects eligible for consideration under the Canada Strategic Infrastructure Fund and outlines a process leading to the specification of environmental sustainability related requirements in allocation decisions by Infrastructure Canada. Major steps in the process of considering specific proposals for infrastructure development include: identifying sustainability issues and opportunities; planning and conducting environmental assessment and other review, negotiation and development activities; preparation of a management plan detailing sustainability related terms and conditions for approval; decision-making; and monitoring and follow-up. The poster also refers to administrative and coordination considerations.

This topic is also the subject of a paper to be delivered at the conference.

Key words: *infrastructure, environmental sustainability, Government of Canada, Infrastructure Canada*

## ENVIRONMENTAL FACTORS ANALYSIS FOR EIA ASSOCIATED TO A HYDROELECTRIC PROJECT: FROM QUALITATIVE TO QUANTITATIVE (poster)

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It's well known that the environmental impacts associated to a dam construction for hydroelectric power (in this case the Hydroelectric Project "La Parota"), are very complex and hard to follow. The construction of this project will cover an extensive area, affecting different elements of the environment including the soil. In order to identify which factors are involved on the degradation of the soil such as the erosion, the loss of soil potential and organic mater, among others, we need to design environmental indicators to improve the ability to report the status of trends in those environmental conditions. Usually the impacts matrixes for

the EIA are filled up with values product of a qualitative analysis; this work is contributing by the incorporation of a method able to give us a quantitative analysis of the different components and the associated impacts, before the matrix is filled-up On the other hand, it helps to establish the different mitigation initiatives and the follow-up of the activities for the project.

Key words: *EIA, hyroelectric project, impacts, indicators, soil*

## SHOULD YOU TRUST VOLUNTARY INITIATIVES: VERIFICATION OF CANADIAN CHEMICAL COMPANIES UNDER RESPONSIBLE CARE

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The effectiveness and public acceptability of voluntary environmental initiatives is dependent on meaningful processes to verify compliance with the expectations of the initiatives. This paper discusses the Responsible Care initiative of the Canadian Chemical Producers' Association (CCPA), and the process for verifying whether Canadian companies are meeting their obligations under Responsible Care. The author was a member of the CCPA's National Advisory Panel from 1989 to 2003 and a member of its Responsible Care Steering Committee, and has been a member of teams that have carried out verifications of chemical companies since 1993. The paper first describes the basic elements (ethic, principles and codes) of Responsible Care, then explains the verification process (who does it, how often, its purposes and methods, reporting and follow-up), and describes how environmental and social impacts and public accountability are addressed. The paper also includes the author's observations on the effectiveness of the verification process and what elements should be required in order to gain public trust in an industry voluntary initiative.

Key words: *voluntary environmental initiatives, chemical producers, responsible care*

## PROBLEM STRUCTURING METHODS FOR TECHNOLOGY FUTURES ANALYSIS

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Innovation provides opportunities for strategic renewal for industry. Significant contributions might be made to innovation by technology assessment techniques that guide the comparison and choice of prospective technologies. Technology futures analysis is one means for guiding difficult choices about science, technology, and innovation. The management of innovation presents a class of problems which are unstructured, and characterized by multiple and divergent perspectives. Methods for impact assessment are needed which are specifically designed for multi-actor settings.

Problem structuring methods constitute a family of operations research techniques. These techniques, however, were made in counter reaction to traditional "hard" operations research approaches. Such approaches presume the significant strategic choices needed to narrow the problem to a set of objectives and constraints have already been made. Fundamental assumptions behind these hard operations research models limit their applicability to many problems. Problem structuring methods were designed specifically for settings with multiple actors, multiple perspectives, and key uncertainties.

This paper reviews problem structuring methods, and examines the applicability of these techniques for technology futures analysis. Examples of problem structuring methods include the strategic options development and analysis approach, and the socio-technical systems approach. The full testing and application of these techniques to real world problems is comparatively new. Previous application in transport planning, technology transfer, and social impact assessment have been promising.

The material in the paper engages with an ongoing and international discussion by the Technology Futures Analysis Methods Working Group. In particular, the working group has asked: Can experimental economics models create a simulated market whereby viewpoints or tactics about the marketing of innovations may be tested? Can electronic discussions be effectively combined with personal interaction? In examining these questions we ask the extent to which human participation in problem structuring methods might be computer mediated.

Key words: *Technology Futures Analysis, problem structuring methods, innovation, computer mediation*

## SOCIAL IMPACT ASSESSMENT IN DEVELOPMENT DECISIONS (poster)

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This poster illustrates the use of SIA at the community and project level to help planners, change agents, elected officials and concerned citizens understand future change in their community as a result of project implementation or policy

change. After a brief definition of SIA and a history of its use in the planning process, the basic Social Assessment Model is laid out. I provide visual examples of how an SIA matrix can be used in a variety of project and policy settings. Next the SIA scoping process is outlined as the way to identify likely social impacts (issues) based on past research and assessments of similar project and policy changes. The content of the social assessment (analysis) is made up of 28 social impact assessment variables (social science indicators) used to explain change in a variety of project/policy settings. These indicators have been extracted from completed EIAs and SIAs and social science research on rural and urban communities. Next is a definition and ways of measuring and analyzing selected SIA variables, followed by demonstrations of significance and procedures for reducing the number of SIA variables to fit a project setting. The use of different data sources for social assessments is also shown. The presentation includes a ranking procedure for the selection of significant SIA variables. Once identified, these SIA variables become the basis for mitigation and enhancement of the social change process. Examples of mitigation and enhancement alternatives are displayed for a representative project. The poster concludes with an outline for presenting the analysis and the SIA key citation index.

Key words: *social impact assessment, development, planning, social change*

## REGIONAL LANDSAT VEGETATION MAPPING OF THE OIL SANDS REGION OF ALBERTA, CANADA (poster)

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Vegetation communities in the Oil Sands Region of Alberta, Canada were mapped using Landsat satellite imagery and GIS to allow the relative abundance of plant communities to be compared within the region. Landsat Thematic Mapper (TM) satellite imagery was collected for two scenes in the summer of 1999. The scenes were georeferenced and mosaicked together as a single image. Approximately 200 ground-truthed sites were collected to verify and train the satellite imagery. The sites were collected based on locations from aerial reconnaissance and 1:20,000 forestry information. Additional regional information sources and surveys were employed to ensure the mapping was representative of the region.

Unsupervised classification initially yielded approximately 100 classes using all seven TM spectral bands. Using training data for reference, these clusters were assigned to the vegetation classes of interest. Even with 100 classes, there were spectral similarities between the naturally occurring clusters. Pixels that could not be successfully assigned to one of the vegetation classes were extracted from the image and reclassified. Reclassification was an iterative process, clustering pixels with similar spectral signatures. Where necessary, land cover classes that were not true to identified classes were reclassified based on additional information.

Classification accuracy was performed using the testing sites and an error matrix was produced. The accuracy of the Landsat imagery classification was identified as 76%.

Key words: *Oil Sands, mapping, vegetation, landsat, remote sensing, supervised classification*

## PROPOSED COMMUNITY BASED MONITORING OF AQUATIC AND TERRESTRIAL RESOURCES IN THE OIL SANDS REGION, NORTHEASTERN ALBERTA FOR THE MIKISEW CREE FIRST NATION DEVELOPMENT INTERVENTION

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The Mikisew Cree First Nations (MCFN) Traditional Lands include much of the area traditionally referred to as the Oil Sands Region, in Northeastern Alberta. The industrial footprint due to the oil and gas industry on the Mikisew Cree Traditional Lands is extensive. Approvals for oil sands development mandate that monitoring programs be developed to assess environmental impacts. The Regional Aquatics Monitoring Program (RAMP) is a joint environmental monitoring program that assesses the health of rivers and lakes in the Oil Sands Region. The Cumulative Environmental Management Association (CEMA) mandate is to provide a forum for regional stakeholders to make consensus-based decisions on managing the region's cumulative environmental effects. Concerns by various stakeholder groups regarding the processes and deliverables of the RAMP and CEMA institutions have been voiced. A prime concern is that present monitoring programs are primarily managed and controlled by development proponents.

IEG Environmental was requested by the MCFN Industry Relations Corporation to develop and administer a monitoring program, in response to the MCFN needs as an intervener at the at the CNRL Horizon and the Shell Jackpine hearings. The proposed monitoring program is based on Environment Canada's nationally recognized Canadian Community Monitoring Network (CCMN). The

Ecological Monitoring and Assessment Network and the Canadian Nature Federation have worked in concert with Environment Canada to develop nationally recognized standards for community based monitoring. A community based monitoring program based on the CCMN model would augment and improve the RAMP and CEMA institutions. If community based monitoring uses the same sampling protocol as RAMP, then data collected in a community based monitoring model could be used to augment the RAMP dataset. Ultimately the use of this approach to monitoring will begin to reflect the value base of all area residents. This will make the data a more trusted tool in overall management decisions.

Key words: *monitoring,First Nations, community based,Oil Sands, water, terrestrial*

## IMPACT ON LOCAL COMPANIES AND WORKERS OF THE ENVIRONMENTAL AND SOCIAL CLAUSES IN PROCUREMENT BIDDING DOCUMENTS IN A LARGE INFRASTRUCTURE PROJECT: THE CASE OF THE CHAD - CAMEROON OIL DEVELOPMENT AND PIPELINE PROJECT

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The Environmental Assessment (EA) of the 3.8 billion $ project (largest single investment in Sub-Saharan Africa, funded, among other financiers, by IFC and the World Bank) was one of the key prerequisites to the approval of the project and World Bank group involvement. The main features of the EA and its preparers are presented and commented. The EA contained, as required by World Bank policies, an Environmental Management Plan (EMP), prepared in 1999 (one year before World Bank's approval of the project) which document provides the basic description of the environmental aspects of the project, and is a contractual framework committing the parties to the appropriate implementation of the project. The main features of the EMP and its method of preparation are presented and commented.

The bidding process involved international and local companies as bidders, in several sectors (described) and the selection process followed is presented and commented.

The results of an ad hoc survey provides the core of this paper. It basically assesses the degree and level of involvement of local companies in the Project, their pre-existing knowledge of environmental and social clauses prior to the Project, appreciates the efforts made to comply with these requirements, assesses the discriminating aspect of these clauses, describes in qualitative terms the adaptation capacity of the local companies. It then goes on to look at to which degree the environmental and social clauses are now part and parcel of routine practices for these companies. Eventually, it assesses the level of interest and the real need for training and awareness raising from the part of these local companies The results of the survey are benchmarked with other internationally funded petroleum and/or pipeline projects in Africa and other places with low pre-project environmental and social management capacities (Angola, Azerbaijan-Georgia-Turkey).

Key words: *bidding documents, environmental clauses, environmental specifications, impact on local companies, capacity building*

## CASE STUDY: POLLUTION PREVENTION INITIATIVES AT AN INDUSTRIAL WASTEWATER TREATMENT PLANT

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During production and maintenance operations at the Oklahoma City Air Logistics Center [OC-ALC], industrial wastewater streams are generated which contain organic and heavy metal compounds. These waste streams result from chemical depainting operations, chemical cleaning processes, and electroplating operations. Processes discharging wastewater are treated at the on-site industrial wastewater treatment facility [IWTF]. The objective of this paper is to highlight some of the experiences that OC-ALC engineers have had over the last years with everything from odor mitigation efforts to evaluating the performance of zeolite media pressure filters. The presentation shall include the following topics: 1. POTW NESHAP: Determine if the OC-ALC IWTF was considered to be a major or minor source as defined by the National Emission Standards for Hazardous Air Pollutants [NESHAP] for Publicly Owned Treatment Works [POTW]. 2. INVESTIGATION OF IWTF ODORS: OC-ALC has made numerous process changes to minimize the odors and improve operations. 3. AIR-SPARGED HYDROCYCLONE TECHNOLOGY: Collaboration with Air Force Research Laboratory to investigate, evaluate, field-test, and design an air-sparged hydrocyclone [ASH] system for application at OC-ALC. 4. IWTF EMISSION FACTORS:

Collaboration with the Oklahoma State University Department of Civil Engineering to develop emission factors for individual process units [i.e., oil-water separators, equalization basins, solid contact clarifiers, lift stations, etc.] at the industrial waste treatment plant. This will be accomplished through application of commercially available computer models [General Fate Models, i.e., WATER9 and TOXCHEM3]. 5. IWTF LIFECYCLE COSTS: Collaboration with the US Air Force Academy Student Research Program to quantify the lifecycle costs associated with operating the industrial wastewater treatment plant processes. This effort quantified IWTF operating costs, i.e., sludge disposal, utility, process unit maintenance, equipment, chemical treatment, labor, etc.

Key words: *industrial wastewater treatment, pollution prevention*

## STRATEGIC ENVIRONMENTAL ASSESSMENT OF A LARGE RURAL DEVELOPMENT PROGRAMME IN ETHIOPIA

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The SEA was conducted as part of requirements for future funding of the SARDP (the Sida-Amhara Rural Development Programme), and as a combined study and capacity-building input to the local environmental-assessment competent authority. Three alternative development scenarios were chosen for the assessment: the 0 alternative; the programme as it has been implemented, and an idealised solution that would have attended fully to all identified strategic environmental priority issues. These three alternatives were then semi-quantitatively scored and compared with the 0 alternative. The present programme scored quite well, higher than the 0 alternative in almost all categories. The only exception that stood out was in the case of rural energy, an important but neglected issue. The idealised case naturally scores quite a bit higher than the actual, but the difference is not alarming. Our conclusions are, in brief: · SARDP is a successful rural development programme in terms of environmental strategy and overall environmental impact, with only a few exceptions. This is in spite of rather weak attention to environmental strategy during the first two phases. In project formulation, a good strategy document was prepared, but this has largely been forgotten in formulations of later work programmes. · The most important omission in terms of long-term sustainability is the complete lack of attention to rural energy issues. The most important success story of the programme, from a sustainability point of view is clearly the land administration reform. In a very short time, a new law has been put in place, and successful field trials have been implemented. Strategically speaking there are some worries at local level regarding the comprehensiveness of the programme, given that some specific key development issues are excluded from the funding.

Key words: *SEA, rural development, Ethiopia*

## CANADIAN PRACTICE IN SCOPING OF ENVIRONMENTAL ASSESSMENTS—THE LAW AND THE REALITY—PROPONENT AND PUBLIC INTEREST PERSPECTIVES

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Deciding the extent of the project to be included in an impact assessment (scope of the project) and the extent and content of the assessment to be carried out (scope of the assessment) are two of the most critical decisions affecting EA practice.

Canadian Federal as well as provincial EA laws provide proponents and government regulators varying degrees of legal duties and discretion regarding both issues.

Often, members of the public are disappointed that proponents propose and government regulators allow the scope of a project to be narrowly defined and that they also may limit or eliminate discussion of need and broad alternatives.

To some extent these decisions are governed by legal requirements - but in practice there appears to be substantial discretion, with the courts not taking an overly intrusive oversight role.

This paper examines legislative requirements, proponent practice, government actions and court decisions to determine whether the objectives of EA, the goal of proponents, and public expectations are being achieved in decisions concerning the scope of project and scope of assessment.

Key words: *impact assessment, scoping, legal requirements, courts and tribunals, public interest, proponent's interest, Canadian practice*

## STRATEGIC ENVIRONMENTAL ASSESSMENT IN KOREA

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Although Environmental Impact Assessment (EIA) in Korea has been improved markedly over the past two decades, by enlarging the range of projects for assessment, instituting public participation and environmental monitoring, and similar measures, it remains deficient in its coverage of programmes and plans at the policy level across major sectors such as large-scale development.

Strategic environmental assessment (SEA) can supply the necessary correctives providing useful measures and methods for integrating environmental considerations in the formulation and spatial and sectoral policies and their implementation in operational programmes. SEA understands as an approach to environmental protection and enhancement by asserting those concerns in formulating policies and devising alternatives for their implementation. This approach would offer significant improvements to the EIA system in Korea. It expects to solve development issues like the Saemangeum land reclamation project have long been in debate through earlier assessment at policy level.

In this process both institutional and methodological obstacles can be anticipated. Institutionally, ministerial resistance may arise from concerns about possible delays in policy reviews and increased programme costs. Methodologically, SEA effectiveness is limited by problems of professional judgment and public understanding. Its application in areas such as greenbelt planning, new town development, and environmental management requires further improvements in assessment tools. It would be useful to review more precisely what methodological improvements are needed and how they can be developed.

In response, the Ministry of Environment is preparing a task force to conduct research and development programme, followed by trial applications in selected policy arenas. Currently it is debating who is responsible agency, development agency or Ministry of Environment.

Key words: *EIA, SEA*

## ENVIRONMENTAL MONITORING OF THE CONSTRUCTION SITES FOR THE OLYMPIC WINTER GAMES "TORINO 2006"

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The International Olympic Committee (IOC) and the Olympic Winter Games "Torino 2006" Organisation Committee (TOROC) have defined as one of their main objectives the protection of environment and human health and the improvement of the environmental quality of the areas involved during all stages of the organisation of the Games. To achieve these objectives, several tools have been developed. These tools include: the Strategic Environmental Assessment, the Environmental and Social Report etc. Among these tools, a comprehensive system of environmental monitoring for the construction of the Olympic facilities has been developed. The Olympic Agency in charge of the construction of the facilities has retained Golder Associates to organize and manage this system of environmental monitoring in the alpine range areas used by Alpine Games. In these areas the following sports events will be held: snowboard, free style, ski jumping, cross country skiing, skiing, bob sleigh, luge and skeleton. The construction works involved (Nordic combined, up to forty sites and comprise the following specific activities: construction and preparation of each contest track, construction of reservoirs and artificial snow making systems, construction of ski-lift and chair-lift facilities and improvement of the transport network. The environmental monitoring system is based on a set of indicators defined in agreement with the Regional Authorities. This system allows to define the baseline conditions and to track the overall changes of the state of the environment at any time during the implementation of the Olympic Programme in the three different phases ante operam, in operam and post operam. This set consists of a number of indicators related to the ( Vibrations; ( Noise ( Air Quality ( Water quality (following thematic areas: Fauna, flora and ecosystems. The data and information collected(Soil quality; are managed through a database and the deliverables include a tri-monthly report.

Key words: *environmental monitoring, Olympic Winter Games,Torino 2006*

## THE CONVERGING EVOLUTION OF LAND-USE PLANNING AND STRATEGIC ENVIRONMENTAL ASSESSMENT

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The prevailing theory of planning is that it is essentially communicative action, in which planners work with the private sector to accomplish public goals, assemble effective teams, manage relations with stakeholders, and direct conflict towards constructive action. Although little has been written on the theory of why and how SEA is supposed to work, its proponents stress that it is inter-disciplinary, involves stakeholders, informs debate, reduces conflict, influences proposal design and improves decisions. Planning and SEA thus have very similar objectives.

Theoretically, SEA works as a policy instrument that allows proponents to develop an understanding of the reactions of potential critics. This enables them to select and design proposals and formulate mitigating measures that avoid or manage conflict. In this way, SEA is a process of mutual adjustment. Proponents and stakeholders are engaged in social learning and in balancing competing values.

SEA exerts less control over land use than was the case in earlier forms of planning where planners directed the type and location of development. SEA requires consideration of alternative objectives, sites, designs, and methods of implementation, and the proponent is centrally involved in the process of formulating these alternatives.

SEA thus entrusts more of the planning to the proponent, with the important procedural proviso that planning and decision making are conducted openly with the involvement of interested and affected parties in the process. Thus, SEA procedures and ethics require environmental professionals to give balancing voice and power to civil society.

SEA needs to converge with land use planning so that its worth as a form of mutual social adjustment and as a mechanism for balancing competing social values becomes accepted. If SEA remains divorced from land-use planning, it is in danger of being perceived as merely a procedural hurdle to development planning.

Key words: *SEA, strategic environmental assessment, land-use planning*

## HEALTH IMPACT ASSESSMENT AND THE IMPROVEMENT OF ECONOMIC ASSESSMENT: REFLECTIONS AND AN INITIAL PROPOSAL FROM RECENT EXPERIENCES IN THAILAND

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In Thailand, impact assessment and economic assessments, like cost-benefit analysis and cost effectiveness, have been applied as a decision-making support tools for about three decades. However, the interconnection between these two important tools is usually overlooked. With the recent experiences in Thailand, it is clear that the insights from HIA can provide some reflections and initial ideas to improve economic assessments in order to support healthy public policy. Instead of calculating "the external costs" alone, there are a number of issues resulted from HIA studies that economists should reconsidered. It is clear that health impacts are not only costs or benefits of the whole society; it is also an issue of distributional effects or justice within the society. In reality, the synergy of different negative or positive health impacts may concentrate on some specific groups. Thus, the economic calculation should not only be the summation of all costs and benefits. It should also give more attention to the interactions between the impacts and people's coping capacities, especially the interconnection between health impacts and poverty. Moreover, the incompatibility of health determinants and impacts makes a traditional proposal for economic compensation become complicated and even ineffective in many cases. Last, since several health impacts are not only the temporarily loss of income or opportunities, it is also permanently limited of capabilities to achieve better quality of life (possibly longer than one generation), i.e. the irreversibility of health impacts. Therefore, economic method, which discounts future benefits and costs (down to zero in some certain years), is not suitable in this situation. Apart from these reflections, the last part will provide an initial proposal to improve the applications of economic assessment. Hopefully, it can pave the ways to make better interconnection between these two main decision-making tools, especially for developing countries.

Key words: *health impact assessment, economic assessment, cost-benefit analysis, Thailand*

## SOCIAL IMPACT ASSESSMENT AND OFFSHORE OIL AND GAS (MMS SESSION DESCRIPTION/OPENING PRESENTATION)

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This session discusses social impacts of offshore oil and gas development on human communities in the Gulf of Mexico and Alaska. It addresses the analysis of impacts under the National Environmental Policy Act (NEPA), and focuses primarily on social effects as opposed to economic or psychological ones. First, we discuss the "classic SIA model,"

the original boomtown model that established the underlying issues, questions, and logic that shape most energy-related socioeconomic assessments. We show that, at the core of this model, project-induced demographic change drives other project-related socioeconomic effects. Second, we describe significant differences between classic model assumptions and the actual demographic consequences of the Gulf of Mexico's and Alaska's oil industry. We show that the industry's effects have been large, long term, widely distributed, based on laws and fiscal policies and locally variable and that they are inadequately addressed by the project-oriented classic SIA model. Third, we return to the classic model and conclude that none of its basic assumptions fit OCS regional realities and that the model is incapable of addressing situations with the magnitude, longevity, or complexity of that faced by social impact assessment in the Gulf of Alaska. This discussion concludes by outlining a strategy for addressing the kinds of assessment problems faced by MMS and by many other federal agencies charged with similar responsibilities.

Key words: *social impact assessment, offshore oil and gas, boom and bust, outer continental shelf*

## CAMEROON'S OIL AND GAS INDUSTRY: CONTROLLING PROJECT ENVIRONMENTAL PERFORMANCE BEYOND EIA

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The Republic of Cameroon is a modest oil-producing country located within the Central and West African region. Currently, oil production is derived from shallow water nearshore concessions, with exploration activities also largely concentrated in the same environment.

The implementation of environmental impact assessment (EIA) in advance of project developments by the oil and gas sector is a relatively recent phenomenon within Cameroon. Although the country has in place an Environmental Framework Law, which regulates the activities of the oil and gas sector, a decree of application, which specifies an EIA procedure, has yet to be issued. In this situation, there is a statutory requirement for industry best practice to be adopted; e.g. for the procedure regarding EIA in neighboring countries to be applied. Cameroon is, however, proving to be a leader in this respect, rather than a follower, and this extends also to important EIA follow-up initiatives that are taking shape within the country.

The current approach to EIA of developments by the offshore oil and gas industry includes a strong focus on establishing the state of marine water quality and mangrove vitality, insofar as these could be at risk from oil spills. This is linked to both the pre-development EIA phase and the post-development situation.

Systematic, repeat sampling and chemical analysis of bio-indicator species (e.g. filter feeders such as oysters) and shoreline sediments is undertaken as a component of EIA and in subsequent monitoring. Chemical analysis of biological tissue and sediments establishes the presence of hydrocarbon product and associated metals, and data interpretation reveals trends in this regard. Results assimilated over time can indicate deterioration or improvement in marine water quality. Fingerprinting of stranded hydrocarbon product using chromatogram profiles assists in establishing the origin of marine pollution.

Taking a more strategic-level perspective of marine water quality monitoring, the country's recently prepared National Oil Spill Contingency Plan provides a structure for the archiving and interpretation of long-term marine water quality data derived from EIA and follow-up environmental monitoring.

Key words: *Cameroon, oil and gas, environmental impact assessment, oil spill contingency planning, environmental monitoring, marine water quality*

## LESSONS LEARNT IN ADDRESSING ENVIRONMENTAL ISSUES OF INFRASTRUCTURE DEVELOPMENT IN THE WATER INDUSTRY: A CASE STUDY IN KWAZULU-NATAL, SOUTH AFRICA

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Developing new water resource projects without taking cognisance of the environmental impacts, both bio-physical and social, has received global condemnation for many years now and is largely becoming a practice of the past. However, it is the prominence, extent of issues addressed, timing and intensity of the investigations and the commitment to environmental protection and mitigation at the construction stage that has increased significantly over the past few years. Practices in the South African water industry are no exception to this.Environmental legislation in South Africa requires that an Integrated Environmental Management (IEM) approach be adopted when any new project is being considered. This IEM approach was recently put to the test in South Africa during the planning and implementation of an inter-basin transfer scheme in the province of KwaZulu-Natal. The scheme required the building of a new large Mearns Weir, the raising of Midmar Dam, the acquisition of the servitude of aqueduct along the receiving streams and the upgrading of infrastructure along the streams to accommodate the raised water levels. This paper will discuss

the steps that were taken to address the environmental issues during a protracted planning phase, and what was accomplished. It will compare how these recommendations were taken forward into the construction phase and the operations phase, identify some of the shortfall of existing practices and discuss the lesson learnt from the process.

Key words: *environmental impact assessment, environmental management plan, inter-basin transfers*

## SEA AND HYDROLOGICAL PLANNING: TWO SYNERGETIC EUROPEAN DIRECTIVES

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Within the water sector, strategic environmental assessment of decision-making is crucial, not only due to the own nature of the resource, but also because of the peculiar characteristics of hydraulic projects.

We are facing a key moment, in which the efforts to implement both the Directive on SEA and the Water Framework Directive coincide, together with a special consciousness on hydraulic resources, after the International Year of Freshwater 2003, and in a context of world water crisis.

The purpose of the WFD-incorporated last December into member states legislation - is "to establish a framework for the protection of inland surface waters, transitional waters, coastal waters and groundwater," and it requires --among others--the preparation of river basin management plans and programmes of measures. What are the links between this Directive and the SEA Directive? Do they overlap? Have we lost the opportunity to incorporate environmental criteria into hydrological planning?

This paper explores the contribution that SEA could make towards a sustainable planning and management of water resources--especially in the framework of the river basin districts--and the role that these bodies could play in the application of the SEA Directive.

Key words: *decision-making, directive, hydrological planning, strategic environmental assessment, SEA, water*

## DEVELOPING SUSTAINABLE DEVELOPMENT INDICATORS FOR THE ELECTRIC UTILITY INDUSTRY

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There is a pressing requirement to determine how electricity needs can be met in a more sustainable manner. Although many electric utilities have begun developing strategies for addressing the challenge of sustainable development, there are ongoing requirements to find methods of measuring progress with respect to the economic, environmental, and social impacts of electric utilities. Fundamental to this task is the creation and implementation of sustainable development indicators. This paper presents a proposed Sustainable Development Indicator (SDI) Design Process for electric utilities in an effort to advance this ongoing work. The development of the protocol was based on collaboration with an electric utility and also involved extensive consultation with external expertise. Systemized through unique process flow charts, it provides a proactive, flexible, and transparent approach to developing and implementing indicators. The six step process to create sustainable development indicators at an electric utility is: (1) conduct a needs assessment, (2) conduct process planning, (3) develop a draft set of indicators, (4) test and adjust the indicators, (5) implement the indicators, and (6) review and improve the indicators. To address the most urgent needs of the electric utility industry, particular emphasis is devoted to the third and fifth steps. With these points in mind, the SDI Design Process will provide a rationale basis for improved design of sustainability indicators at electric utilities.

Key words: *sustainable development, indicators, integrated management systems, electric utilities*

## INTEGRATED ENVIRONMENTAL, SOCIAL AND HEALTH AND SAFETY MANAGEMENT SYSTEMS AS A COMPLEMENT TO THE ESIA PROCESS

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The International Finance Corporation (IFC)--the private sector arm of the World Bank--has an investment assessment process which incorporates a standard ESIA approach-through identification of environmental and social impacts, to definition of mitigative measures and specification of a corrective action plan (CAP). Increasingly, IFC sees significant advantages in complementing this up-front assessment with the establishment in the client's company of a formal environmental management system to provide the framework for the ongoing assessment of environmental and social impacts, monitoring of regulatory compliance and progress towards completion of the CAP. Formal environmental management systems are attractive for this purpose in that they provide a defined framework which is subject to independent external auditing to internationally-agreed standards and which is adaptable to a wide range of project types and sectors. IFC's assessment covers environmental and social impacts including a focus on occupational health and safety issues. These can be combined in an integrated management system which incorporates both the ISO 14001 and OHSAS 18001 standards. It is necessary to ensure that the regulatory compliance aspects and other mitigation measures are properly identified in the system's objectives and targets. This paper addresses IFC's approach to incorporation of environmental, social and health and safety aspects in an integrated management system, and how this can serve as a framework for supervision of IFC investments in a variety of sectors.

Key words: *integrated EMS, environmental and social impact assessment*

## ADDRESSING THE SOCIAL DIMENSIONS OF PRIVATE SECTOR PROJECTS

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The management of social issues poses a key challenge for many private companies operating in emerging markets. Identifying and addressing these issues early on and managing them actively throughout the project can increase the likelihood of project success by: creating broader social support for the investment, reducing risks and uncertainties, enhancing the company's reputation, and, helping to maintain a local license to operate. The International Finance Corporation has recently issued a Good Practice Note on social impact assessment designed to provide private sector companies and practitioners with how-to guidance in identifying and assessing impacts and opportunities in IFC-financed projects. The paper argues that it is in the best interest of private sector companies to have solid socioeconomic data upfront as a means of reducing and managing social risks and improving project design. IFC's model is characterized by an integrated approach to environmental and social issues (resulting in a combined ESIA document) and is specifically targeted at the project level and to private sector investments in developing country contexts. Another unique feature of IFC's approach is the use of SIA as a tool for the proactive identification of sustainable development opportunities that may arise within the context of a project. This constitutes a significant departure from traditional impact assessment methodologies which tend to focus primarily on the identification and mitigation of adverse impacts. IFC advocates expanding the scope and function of the social assessment process to look at positive impacts and opportunities to enhance the socioeconomic well-being of communities in the project's area of influence. The Good Practice Note has been written by a team of IFC Social Development Specialists based on their applied experiences and lessons learned in private sector operations across a broad range of industry sectors and regions.

Key words: *social impact assessment, ESIA, social risk, private sector, international finance*

## THE ROLE OF DEVELOPERS IN IMPLEMENTING LOW IMPACT URBAN DESIGN IN HOUSING DEVELOPMENTS IN AUCKLAND, NEW ZEALAND

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The Auckland Region, which contains over 30% of New Zealand's population, is undergoing rapid growth. The region's population is expected to double in the next 50 years. This growth is putting enormous pressure on the development of land for new housing. Regional and local regulators have adopted a strategy of intensification to curb urban sprawl. The strategy includes the development of green field sites and intensification of established urban areas

through the provision of medium and high density housing in the context of sustainable management. There is increasing recognition of the need, by both local and central government, to improve the sustainability of New Zealand's cities and towns through measures such as reducing the environmental impacts of infrastructure. Accordingly, developers have an important role to play in the implementation of low impact sustainable urban design solutions.

This paper draws on a pilot study carried out in Auckland which looked at the extent to which developers considered impacts, particularly environmental impacts, in the design and construction of medium housing developments. The impacts were considered in the context of sustainable urban design. We were interested in finding out whether developers consider the incorporation of low impact design features when planning medium density housing projects, the impediments to incorporating these features and what would assist them to incorporate these features in the future.

The paper then examines how we can use this information to work with developers to encourage the incorporation of low impact urban design features in future developments. A critical element in achieving more sustainable urban environments is the need for the development community to understand the role of impact assessment when looking a range of ways of undertaking developments, from the conventional to the innovative.

Key words: *developers, medium density housing developments, low impact design and development*

## A CANADIAN PERSPECTIVE ON EIA AND AQUACULTURE DEVELOPMENT

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The growth of world aquaculture over the past two decades has been remarkable, now having attained a level accounting for more than 20% of global fish and seafood production. Current predictions anticipate that aquaculture will provide 50% of aquatic food production by the middle of the present century. It is obvious such rapid development can only be sustainable through adherence to stringent environmental quality standards and through good practice in the conduct of EIA for aquaculture. The ecological impacts of aquaculture in coastal marine and aquatic inland localities have ranged from benign to catastrophic, depending on the degree to which appropriate regional planning measures and environmental protection protocols have been developed and implemented. EIA has a critical part to play in guiding and complementing these processes, and as well to ensure that the socioeconomic and human health components of aquaculture development are fully taken into consideration. The application of EIA to aquaculture in Canada is implemented through the Canadian Environmental Assessment Act and guided by the Canadian Environmental Assessment Agency of Environment Canada. Impact assessments for aquaculture project proposals in marine coastal areas are generally conducted by the Department of Fisheries and Oceans. In practice, the utilization of EIA in the planning process for the development of Atlantic salmon production facilities on the coasts of Canada has met with varying success, and at present there remain challenges in ensuring that best practice protocols are consistently invoked. In common with comparable Atlantic salmon aquaculture regions in Europe, issues of fish farm wastes can satisfactorily addressed, but concerns about the spread of disease and the effects of escapees on wild fish populations remain problematic. This paper will identify and analyze key contentious issues associated with the application of the federal EIA process to aquaculture development proposals along the west coast of Canada.

Key words: *aquaculture, EIA, coastal zone management, sustainable development, marine, aquatic*

## ACHIEVING ECOLOGICAL SUSTAINABILITY IN THE ENVIRONMENTAL ASSESSMENT REVIEW OF RUN-OF-RIVER HYDROPOWER PROJECTS IN BRITISH COLUMBIA, CANADA

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In response to issues such as the global need to reduce greenhouse gas production from electrical energy generation, increasing numbers of small and medium sized hydropower projects are being proposed in British Columbia, Canada. These renewable energy projects are also called "green energy," provided that they meet certain environmental, social and economic criteria. They are invariably run-of-river, with no appreciable storage. Usually these projects must

undergo a Canadian federal or provincial environmental assessment review. Environmental assessment has long been advocated as one method to help achieve ecological sustainability.

This paper proposes to help answer the following question: How can review agencies and proponents achieve ecological sustainability in the environmental assessment of run-of-river hydropower projects? How should they "...take actions that promote sustainable development" in their reviews as encouraged by the Canadian Environmental Assessment Act. This research proposes a vision that "lower impact run-of-river hydropower projects are identified, encouraged, and reviewed, through an environmental assessment process, to consistently and efficiently meet the goals of ecological sustainability." The question of ecological sustainability needs to be addressed from the "how" or process and people issues, the "what" or environmental science issues, and the interrelationships of these issues.

Important challenges relate to ecological streamflow needs and the capacity of reviewers and proponents to conduct the assessment. For reviews under the Canadian Environmental Assessment Act, the use of class screenings or class assessments offers a potential solution for those run-of-river project elements that are routine and generally understood. However, more immediate solutions lie with best management and technical guidelines that clearly and reasonably outline expectations. Other solutions lie with adaptive environmental management, building team learning capacity into interagency reviews, and the use of strategic environmental assessment to help address the cumulative environmental effects of many run-of-river projects within a single region.

Key words: *run-of-river hydropower, small hydro, environmental assessment, green energy, ecological sustainability, class assessment, class screenings*

## AN EXPERIMENTAL STUDY ON THE MULTIGENERATIONAL WORKSHOP FOR SUSTAINABLE SOCIETY

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Making a sustainable society is one of the most important policies at present. Sustainability should be built from the points of view based on the community. Public participation is a fundamental process for implementation of environmental planning. In particular, future generations taking part in this process could make the plan feasible. This study focused on the workshop approach as one method that makes collaboration between adults and children. Two series of experimental workshops were carried out on Yakushima Island, one of the World Natural Heritages in Japan, to clarify the effect of the collaboration of different generations. In the first meeting, participants perceived the relationship between the nature and their life environment through the nature games. In the second, economical and social problems were mainly discussed by each group. While Yakushima attract a great deal of tourists, residents have faced serious problems such as luck of employment opportunities, depopulation of the young ages, waste problems and so on. So that it could be cleared the effect of the collaboration of different generations, workshops were divided into three groups: children only, mix of children and adults, and adults only. Analyzing workshop productions and questionnaire researches, the effect of the multigenerational workshop is revealed as follows: (1) a lot of multiple opinions which are produced by the participants has been gradually cleared as well as shared among the different generations, (2) while children tend to complain of their environmental situation, some children who belonged to the mixed group suggested some alternatives, (3) some mixed-group-children changed their awareness, such as judgment for reduction of public constructions through the interactive information exchange. Thus, a collaborative workshop is one of noticeable way to build capacity which enables young generations participate in the planning process.

Key words: *workshop, public participation, capacity building, sustainable society, World Natural Heritage*

## TRANSBOUNDARY WINTER FOG IN PAKISTAN: CAN EIA PLAY A ROLE IN CONTROLLING TRANSBOUNDARY POLLUTION?

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Environmental Impact Assessment, to an extent, has played a positive role in checking pollution within the geographical boundaries of a country. However, despite efficacy at home, it has not been able to play a very effective role in combating transboundary movement of pollutants. The fog episode that occurs every winter in Pakistan and India is one transboundary issue that has not subsided despite increased use of EIA and its enforcement in both countries.

The transboundary movement of pollutants has become an increasingly serious issue due to rapid industrial development. This problem is quite palpable in Pakistan in the province of Punjab where life comes to a grinding halt during winters due to severe fog. Remote sensing satellite data shows fog covering an area approximately 1,500 km long extending from eastern India (Bihar) to northwestern Punjab. On December 16, 1998, the mean daily visibility in New Delhi was approximately 100 meters and during the same period in Lahore (approximately 450 km from New Delhi) it was

only a few hundred meters. Studies have shown that the fog episode is quite severe for two weeks in December and January and causes extensive economic loss and health problems in Pakistan.

A six year study (1997-2002) conducted by SUPARCO (Pakistan Space and Upper Atmosphere Research Commission) determined the concentrations of sulfates, nitrates and selected trace elements (Cr, Fe, Zn, As, Se and Sb) at Lahore and Islamabad during and after the fog by sampling and analyzing aerosols. The analysis showed excessively high sulfate (SO4) concentrations varying from 49.8 to 98.9 (g/m3. The sulfate and selenium ratios (SO4-2/Se) and 925 mb wind data suggest a distant source of sulfate.

The northeastern cities of Pakistan lie downwind to coal burning industries in India, receiving heavy loads of sulfur dioxide, which is the main constituent of the fog. Fog creates hazardous conditions for air and road traffic, human health and agriculture. The cities affected by the phenomenon get cut off from the rest of the country, thereby compounding the problem. Investigations are currently underway to study the economic and health implications of fog on the country.

It can be argued that the increase in the intensity and duration of fog during recent years could be due to low precipitation and the four year drought in the South Asia region. It can also be argued that although there is lot of talk about EIA enforcement, little has happened on ground and a policy of "business as usual" prevails. Further investigation is needed to fully understand the reasons behind the fog every year.

Key words: *air pollution, fog, India, Pakistan, South Asia, transboundary*

## IS SEA THE ANSWER TO ENVIRONMENTAL DEGRADATION IN DEVELOPING COUNTRIES?

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At present, experts are pushing SEA as the long-term solution to environmental degradation in a country. It is widely claimed and seen as an answer to EIA, which although successful at a certain level, has failed to deliver all expected results. SEA is being practiced in some developed countries like Netherlands, quite successfully and has also been made a legal requirement. Similarly some developing countries have also flirted with the idea but except for a few success stories (South Africa and Hong Kong), most have not gone beyond awareness raising.

Pakistan is one country which has tried to introduce SEA in the decision-making circles of the country but have not been able to take it beyond that. The countries that have succeeded with SEA thus far, are those which have strong implementing and enforcement institutions to provide support to policies. In most developing countries, however, the reality is that even if they manage to environmentally baptize their policies, they do not have institutions to support the implementation of those policies. In addition, other factors like lack of political will and resources (both financial and human), corruption, etc. are other major constraints. This paper argues that even if policies and legislation are environment friendly, there is no guarantee that the enforcement will be strong as well. A case study of the development of Pakistan Environmental Protection Act (PEPA) and examples from other countries will be used to support the argument.

Key words: *Pakistan, SEA*

## ASSESSMENT OF HEALTH IMPACT ON SAMUT SONGKRAM PROVINCE: THE CASE STUDY OF PROJECT DIVERTING WATER FROM MAE KLONG RIVER (PHASE 1)

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Water scarcity and quality problems in Chao Praya basin has led to a project diverting water from Mae Klong Basin to serve the population in Bangkok. For the government, the reason that this diversion has not been a problem thus far is because the Mae Klong River has a surplus of water which is drained into the ocean if it is not used. And diverting water has not reduced water consumption for Mae Klong water users.

But as for people in the Mae Klong basin, we found that most people did not know about this project, and people who have information feel concern about water scarcity; they do not think that the Mae Klong River has a surplus of water at present. In the future, the water demand along the Mae Klong increases or more water is needed. Diverting the water will surely create more conflict between the water users. This is one case which illustrates a conflict related to scarcity in water resource allocation in Thailand because of seemingly unfair water allocation. People along the lower Mae Klong River have to make sacrifices without any compensation being made.

The purpose of this study is to assess health impact. The study will be an approach based on recognition of rights with participatory process. Assessment of impact might be developed as a tool for future planning and decision-making in the similar project. The results, such as negative impact on health status, should be minimized through appropriate mitigation. We chose Samut Songkram province for the area

study because this province is at the mouth of the Mae Klong River. The results from expert meetings were documented for the last stakeholders meeting that 46 indicators in 4 dimensions (Physical, Mental, Social and Spiritual Health) were introduced.

Key words: *health impact assessment, water scarcity, diverting water*

## INTEGRATION OF SEA WITH URBAN AND REGIONAL PLANNING RELATED TO TOTAL POLLUTION LOAD MANAGEMENT SYSTEM IN KOREA

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The total pollution load management system (TPLMS) of four large major rivers in Korea has been implemented upon Act relating to Water Resources in Han River and Community Support, Special Act on Nakdong River's Watershed Management, Special Act on Geum River's Watershed Management and Special Act on Yeongsan and Seomjin River's Watershed Management since 2002.

TPLMS is the system for the reduction of pollution loading of existing and new pollutant sources and urban and regional development planning. The allocation of pollution loading to local government, groups of major pollutant sources, and individual pollutant sources is carried out based on water quality modeling. The content of master plan and implementation plan of TPLMS is also included in the sewage treatment plan of local government. Therefore TPLMS could be applied as the application technique of SEA.

EIA based on Environmental Impact Assessment Act on Environment, Transportation and Natural Disaster is the system, where the impact of the large scale development project is predicted and assessed, and the alternatives for the abatement of adverse impact is also suggested.

The Pre-Environmental Assessment (EA) based on Basic Environmental Policy Act has similar concept of SEA and EIA, because it predicts and assesses the environmental impact of administration plan and the small-scale development project in environmentally sensitive region.

Therefore, the contents of EIA, Pre-EA, development planning and sewage treatment plan, which are being implemented separately or independently but have similar purposes, could be overlapped and at sometimes bring about inconsistency among them.

This study suggests the integration of SEA and urban and regional planning under the control of TPLMS, and the integration of SEA, EIA, and Pre-EA toward integrated EIA system.

Key words: *Total Pollution Load Management System (TPLMS)), environmental impact assessment, EIA, strategic environmental assessment, SEA*

## REDESIGNING THE ENVIRONMENTAL ASSESSMENT SYSTEM OF KOREA

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Since the late 1970s, Environmental Impact Assessment in Korea has played an important role in decision-making processes particularly for environmentally sensitive projects. However, the EIA system alone has sometimes not been so effective to ensure the successful resolution of environmental concerns. For instance, most of EIA are usually carried out after many important strategic decisions at the earlier stage have been made without any environmental consideration. Therefore, it is hard to cancel or change the project fundamentally even though environmentally big problems are found. In such cases, alternatives and mitigation measures are also very limited. In order to overcome such a limitation of the EIA system, a new assessment system called Preliminary

Environmental Review System (PERS), which is relevant to SEA in some aspects, was introduced in 1999 by an amendment of the Basic Environmental Policy Act (BEPA). The PERS aims to balance development and preservation by identifying possible environmental impacts of some administrative plans mainly related to development projects in the early stages of planning. However, PERS has still appeared to have some weak points such as 1) a limited range of positive list and 2) weakness of tiering (or vertical integration) from PERS to EIA. This research analyzed the PERS in order to check out if it fully sustains certain SEA principles and performance criteria. In addition, a total of 106 administrative plans including the present 39 for PERS were thoroughly investigated. As a result, 89 of them were selected for a future consideration when redesigning the environmental assessment system including their legal bases. It is also suggested that BEPA and EIA laws would be amended for the new EA system.

Key words: *Korea, preliminary environmental review system, SEA*

## TOWARDS GUIDELINES FOR ANALYTIC SUPPORT IN MULTI-ACTOR SITUATIONS

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The assumption that the scientific quality of information provided is the key factor in determining use of information by decision makers has been challenged by both practical experience as well as by theoretical arguments from human decision theory and the policy sciences. Other factors appear to have strong influence on the use of information decision making. This presentation will highlight some of the findings from two recent Ph D studies performed within the ongoing Multi-Actor Systems programme at Delft University of Technology. The studies focused on policy analysis in multi-actor situations, one of the studies concentrated on participative policy processes. In both studies, theoretical notions from a variety of literature sources were complemented by empirical case studies. Particular emphasis was on the valuation and use of analytic information by participants, including stakeholders and (public) decision makers The studies indicate the need for:

- Trustworthiness of the analysis
- Broadness and integration of information
- An explicit multi-actor focus, allowing for multiple perspectives, and giving due attention to the possibility of intertwining interests and compensation
- Access to and dosage of information
- Support of participants in participative settings
- Variety generation and creativity
- Clarity in procedures and processes

The presentation will elaborate on ways in which these needs may be fulfilled. The empirical part of the research indicates that not meeting these needs may lead to problems. It does, however, not provide conclusive evidence that meeting most of these needs guarantees success, or that ignoring some is a certain recipe for failure. Factors other than the kind of information, and the way in which it is provided, may play a dominant roles, such as political changes and external events.

Key words: *decision making, policy analysis, multi-actor systems*

## APPLYING HEALTH IMPACT ASSESSMENT TO NATIONAL AGRICULTURAL POLICY: THE HEALTH IMPLICATIONS OF THE COMMON AGRICULTURAL POLICY IN A COUNTRY JOINING THE EUROPEAN UNION IN 2004

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This paper presents the results of an HIA of national agriculture policy completed by the Slovenian Government in November 2003. In May 2004 Slovenia will join the EU and is required to adopt EU law. The EU Common Agricultural Policy (CAP) accounts for nearly 50% of the EU budget and consists of vast amounts of inflexible legislation which has no public health consideration. The HIA basically followed a six-stage process, policy analysis, rapid appraisal workshops with stakeholders, review of evidence relevant to agricultural, analysis of Slovenian health-related indicators, a report on the findings presented to parliament in November 2003, and evaluation. The results of the HIA were fed into the government policy process as part of the ongoing development of the inter-sectoral National food and nutrition action plan. This paper will present the results and recommendations made to the government of Slovenia for specific agricultural sectors including fruit and vegetable, dairy and wine regimes, and rural development policy. The focus is how CAP policy can be used to promote production which improves public health. E.g, Slovenians currently only consume 75% of the WHO recommended intake of fruit and vegetables, and only 60% consumed are grown in Slovenia. There is opportunity to increase consumption and market sector for horticulture, having health benefits by reducing cardio-vascular disease and cancer, and indirect effects on socio-economic status by preserving traditional farm livelihoods. Also current EU dairy policy will force Slovenia to increase the milk fat content of existing milk bought by consumers. The use of HIA in Slovenia has been a useful mechanism for raising broader public health issues on the agricultural policy agenda. The process has had positive impacts on inter-sectoral working, and is seen as a useful tool for embedding public health across policy sectors.

Key words: *health impact assessment, agriculture, policy*

## ROLES OF HEALTH IMPACT ASSESSMENT AND THE POTASH MINING PROJECT

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Thai people and the environment have been suffering due to development projects for a long time. "Health Impact Assessment" is one of social innovations that can prevent and mitigate such problems.

The Potash Mining Project in Udorn Thani Province: High quality potash has been discovered in Udorn Thani since 1981. The Asia Pacific Potash Corporation (APPC) has planned to invest around $US 64.5 millions on the mine. A 320 hectare-size plot of land has been purchased for the buildings of the plant. Expectedly, 5 millions of the remnants of Potash salts will be carried back into the underground and take around 22 years to finish. A number of meetings and public hearings have been organized by the protesters. Pitfalls in the EIA report and unfair agreement in the contract were the major arguments. People in the mining areas have been separated into two opposite sides.
Roles of Health Impact Assessment : The HIA working group of the Health Systems Research Institute has joined the Udorn Thani working group to organize a seminar on "The Application of Health Impact Assessment Process" on 17-18 May 2003. There were around 500 participants. The seminar processes consisted of lectures from academics, APPC, Human Right Committee and small-group brainstorming sessions to listen to voices of health concerns among participants. Afterwards, the Minister of Natural Resources and Environment has directed his staff to study the seminar documents. On 3 June 2003, the committee of experts in environment reconsidering the EIA report has concluded that the EIA report has a numbers of major mistakes and was not suitable for the permission process. Seminars and public hearings in communities both rural and urban have still been organized regularly. Bringing "Health Values" to the debates about development is strongly beneficial. The approach can be leading to sustainable development.

*Key words: health impact assessment, potash, mining, Thailand*

## INTEGRATED POLLUTION PREVENTION AND CONTROL (IPPC): AN INSIGHT INTO THE EXPERIENCE OF HEALTH AUTHORITIES IN THE NORTHERN AND YORKSHIRE AREA OF THE NORTH EAST OF ENGLAND

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Following the implementation of the Pollution Prevention and Control Regulations on 1st August 2000, health authorities in England and Wales became statutory consultees for permits issued to industry by the environmental regulator (i.e. the Environmental Agency or the Local Authority). In this paper we describe the practice of providing public health input into the Integrated Pollution Prevention and Control (IPPC) regime by using the experience of the Northern and Yorkshire health authorities in the North East of England. So far these authorities have responded to approximately sixty applications from industries ranging from waste management installations to chemical plants. Additionally, we identify the benefits and value added of consulting health authorities in IPPC as well as the opportunities in this practice to learn from statutory consultations in Environmental Impact Assessment. We also describe the constraints that currently face the effectiveness of public health input to the IPPC process for permitting potentially polluting industries. These include, but are not exclusive to, limited capacity and capability of health authorities, lack of the evidence base and limited understanding of the different institutional roles in the IPPC process. Finally, we recommend measures to improve the effectiveness of the public health input to the IPPC process.

Key words: *integrated pollution prevention and control (IPPC), industries, public health, North-East, England*

## STRATEGIC COMMUNICATION FOR IMPACT ASSESSMENT: LESSONS LEARNED FROM THE IAIA'03 MARRAKECH PRACTITIONER'S FORUM AND REVIEW OF SELECTED RECENT EXPERIENCES

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At the 2003 Annual Meeting of the International Association for Impact assessment in Marrakech practitioners forum different organizations and civil servants from both the developed and developing countries gathered to discuss the role of communications for impact assessment of policies, programs and projects. The purpose of this paper is to present the outcome of that discussion and corroborating it with a selected literature review of documented experiences on the topic.

Communications has been recognized as playing a key role in the different stages of an investment cycle, therefore having a strong impact on how an investment is perceived by the different stakeholders. It has evolved towards a process that can be characterized as a two-way flow of information providing consensus building and facilitating the decision making process, rather than a marketing tool to "sell" the investment to unaware audiences.

The paper reviews several areas of intervention of communication, ranging from the use of communication research and techniques as a key analytical component of impact assessment, to the continuous efforts to nurturing the participatory process around the investment decision - in the decision making process - and its implementation. Good communication also becomes a major tool to make policy, programs and projects more efficient in answering the real development needs of communities - according to their own reality - while at the same time making decisions more consensual and sustainable.

The paper also reviews some case studies and practical experiences from the private sector and the public sector, with emphasis in developing countries, highlighting the major lessons learned on the issue.

Key words: *risk communication, public participation, impact assessment*

## THE DIDACTICS OF EIA

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The EIA practice is the same in all countries, but this study's hypothesis is that education and learning differs even though the goal is the same; the students should conduct good EIAs after their training. We should learn from each other's education methods as well as differences and similarities with the aim to improve the quality of EIA.

The quality of the EIAs made in Sweden varies greatly. Sometimes the process is well accomplished and only the most relevant impacts are included in the EIA-document, but

not too infrequently the quality is low and the quantity of pages is unnecessarily high. There might be different reasons for low quality and one identified reason is that the EIA competence among EIA consultancies could be improved. One way to handle this problem is to improve the EIA education.

Different universities and other education institutions have different items included in the EIA courses and the emphasis is put on different aspects. Some trainers are more theoretical while others have a more practical approach with for example real case studies used in the classroom.

To improve the EIA education in Sweden, the Swedish EIA Centre has made an inventory of the need for further education for EIA teachers at the different Swedish universities. Teachers at 23 universities have joined a network and are regularly getting updated information from the EIA Centre and are offered seminars and further education.

Another part of the project is an ongoing study on the didactics of EIA, i.e., how the teaching and learning of EIA functions in different countries. By interviewing teachers from other countries we will get a number of examples on how EIA education could be run. These case studies will give an input to improve the EIA education in Sweden.

Key words: *didactics, EIA, network, education, Sweden*

## INCORPORATING SUSTAINABILITY INTO ENVIRONMENTAL IMPACT ASSESSMENT: A CASE STUDY OF THE VANCOUVER 2010 OLYMPIC AND PARALYMPIC WINTER GAMES

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In July of 2003, Vancouver, British Columbia won the right to host the 2010 Olympic and Paralympic Winter Games. The games are to be held during February and March of 2010 in Vancouver and Whistler, B.C. and will include development of 14 venues. This will include re-development of old facilities and creation of new ones. It is expected to generate significant capital investment and people from all parts of the globe are expected to watch the games. The vision is to "Create sustainable legacies for athletes and sport development, our host communities, our province, our country and the global Olympic Family by hosting and outstanding Olympic Winter and Winter Paralympic Winter Games."

As part of the successful bid for the games, the Vancouver 2010 Bid Corporation committed to developing the Bid and venues and hosting the games in an environmentally and socially responsible manner. This included completing an environmental impact assessment with a framework and lens for assessing sustainability. The assessment examined three primary aspects of sustainability: environment stewardship, social responsibility and economic opportunity. The assessment also examined how venue development could meet these commitments.

From this assessment and commitments made to the IOC, a series of systems and management plans are being developed. These include: detailed Environmental Impact Assessment of key venues in the Callaghan Valley, Cypress and Whistler, a Sustainability Management System, Sustainable Energy Management, Sustainability Procurement Polices and Green Building Design criteria.

The intent is to create an Olympic environmental legacy, both for the citizens of Canada and the IOC.

Key words: *environmental impact, sustainability,Olympics, Vancouver, Whistler*

## WHAT MAKES RISK ANALYSIS A SUCCESSFUL BUSINESS. CAN LESSONS FOR IMPACT ASSESSMENT BE LEARNED?

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Like in any other service industry, Impact Assessment (IA) professionals deliver services to clients. In current IA practice, these services are heavily biased to the feasibility and design stages of an investment. However, it is increasingly acknowledged that unless the results of conventional IA carry over into investment implementation, its value is reduced. There is a recognition that services provided by impact assessment professionals are sub-optimal in this respect and, therefore, limited in their potential contribution to development impact.

There is an increasing interest in addressing the challenges of moving from Impact Assessment (perceived as one-off, static, reactive view) to Impact Management (continuous process, dynamic, proactive approach) using risk analysis as a core concept. Current IA practice tends to focus on known or readily identifiable impacts. However, there is a recognition that conventional IA is limited in the extent to which it is used to evaluate and respond to future risks which emerge during project implementation.

This paper examines lessons learned from the risk analysis and risk management industry (i.e., insurance professionals) in order to identify potential strategies to help move from Impact Assessment to Impact Management. In order to derive lessons from industry approaches, the paper analyzes some of the characteristics of risk analysis (RA) as practiced in these industries in order to understand what makes RA so successful and so integral to current business practices. The paper analyzes various institutional mechanisms to build such incentives and some advanced approaches where Impact Assessment has been directly linked to its follow-up.

The insurance industry, a multi-billion conglomerate of huge and smaller companies, some international, some local, thrives on risk analysis. The "aspirating pump" of risk analysis creates the financial incentives and the conditions for excellence and for the constant quest for improved methodological approaches and tools. Laying out these features will help determine out how new and better bridges could be built between the communities dealing with IA and RA.

Key words: *impact assessment, risk analysis, business of impact assessment, interfacing IA and RA*

## TECHNOLOGY ASSESSMENT - A FRAMEWORK FOR COMBINATION OF TOOLS

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In line with the need to live up to the requirements of the notion of sustainable development, a framework for assessment of the ecological, economic and social impacts of technologies is necessary. Technology is defined in terms of man's interference on natural mass and energy flows. The material flows are mainly related to the carbon, nitrogen, sulfur and phosphorus flows. In the paper the combination of different systems analysis tools within the framework for technology assessment is advocated. Tools such as material flow analysis, life cycle assessment, life cycle costing and social impact assessment work under the same platform. This gives the possibility for interdisciplinary fertilization of knowledge. The impact of the technology can be assessed at various phases of its maturity depending on the purpose of the assessment and the end-user of the information processed. The framework for technology assessment is for implementation in a computer based tool. The tool uses qualitative and quantitative data from participatory consultation of stakeholders both as a raw input and as background information for final analysis of results. It is composed of three parts namely data input, data processing and result presentation parts. Modular feature of the tool offers flexibility, transparency and simplicity. Besides it has the advantage of making more even-handed assessment in comparison what has been featured by conventional technology assessment. Further development is required with regard to the weighting of different aspects within the ecological and social dimension of the assessment and a comparative analysis of the results from these two as well as the economic part.

Key words: *technology assessment, material flow analysis, life cycle assessment, life cycle costing*

## IMPACT ASSESSMENT AND INTERNATIONAL FINANCE

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Increasingly, international financial institutions are using the instrument of environmental and social impact assessment (IA) to manage environmental and social risk on projects they finance as well as to improve investment quality and sustainability. For multilateral and bilateral development finance institutions, export credit agencies and commercial banks, impact assessment is becoming integral to prudent project financing.

Since June 2003, 19 of the largest commercial banks, involved in over 74% of international development lending, have adopted the Equator Principles, which commits them to:

- Screen and categorize projects for environmental and social risks
- Assess social and environmental impacts accordingly
- Manage potential impacts pro-actively and transparently
- Covenant environmental and social requirements in loan documentation

Policies and procedures under the Equator Principles have been adopted from the environmental and social review process established by the International Finance Corporation (IFC)-the private sector arm of the World Bank Group. Similarly, export credit agencies which are members of the Export Credits Group of the Organisation for Economic Co-operation and Development (OECD) have agreed on the "Common Approaches on Environment and Officially Supported Export Credits." requiring each export credit agency to apply the same environmental requirements to their investments. As well, the multi-lateral development finance institutions are also working to harmonize their environmental and social assessment requirements.

This Theme Forum will be one of the first international events to focus specifically on the use of impact assessment by the international finance community. It will be an important opportunity for international finance and impact assessment practitioners to meet, to share experiences, and to learn how these new initiatives are unfolding.

Topics in this Theme Forum will include the latest information on the application of the Equator Principles, the status and future of the OECD's "Common Approaches on the Environment," financial institution processes for implementing IA, integrating IA into financial decision-making, the corporate reputational benefits of IA, and IA as a financial risk management tool.

## ENVIRONMENTAL FOLLOW-UP OF OPERATION AND MAINTENANCE OF RAILWAY INFRASTRUCTURE IN SWEDEN AND SOME OTHER COUNTRIES

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Ongoing follow-up and continual improvements are basic components of environmental management systems (EMS). Nevertheless, the contribution of EMS to increased environmental performance is widely debated. For example, implementation of EMS sometimes tends to take the focus away from actual improvements of the environmental performance. Furthermore, according to the international standard ISO 14001, continual improvement is only required for the significant environmental aspects identified by the organisations. That is, the standard stipulates nothing about the total environmental impact of the organisation's activities as a whole.

In Sweden, some central authorities have a special responsibility for their own sectors and need to be proactive in their environmental commitment. Banverket (Swedish National Rail Agency) is responsible for the Swedish railway sector and is hence responsible for the achievement of ecological sustainability of the Swedish rail transport system. This responsibility implies an active commitment to continually improve the environmental performance of the organisation. A well functioning environmental follow-up program is therefore essential.

A case study has been initiated to evaluate Banverket's present program for follow-up of its operation and maintenance activities. The study aims to increase the effectiveness of the environmental follow-up of operation and maintenance of the rail infrastructure and hence increase the environmental performance of Banverket. In order to compare Banverket's follow-up activities with other rail administrations, a questionnaire was sent to rail administrations in 22 foreign countries. In this contribution, preliminary results of the case study are presented. The focus is on the structure of Banverket's follow-up program in relation to international experience as well as on indicators used to follow-up operation and maintenance activities.

Key words: *follow up, environmental performance, railways, EMS*

## ECOPHYSIOGRAPHIC STUDY AS THE BASIS FOR A RATIONAL SPATIAL PLANNING

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The ecophysiographic study has been obligatorily executed under the procedure of area development planning. The documents are prepared both for the local plans as well as for the voivodeship area development planning. The Ecophysiographic study contains an evaluation of the state of the particular items of the environment including the geological, water, soil, lanscape and climate evaluation etc.and the evaluation of their usefulness for the development of specific functions such as construction, recreation, services etc.

Apart from that specification of the state of the threat for the environment constitutes the subject of the ecophysiographic studies - noise, pollution of the air water, soil degradation etc. Depending on the level of the threat for the environment instructions are formulated for the function and area solutions in the projects of the area development planning. According to the regulations in force the ecophysiographic elaboration is prepared separately for every plan of the area development and it has to be established before the commencement of the work on the plan. In order to provide sufficient level of detail of the information about

the environment and its threats, the ecophysiographic study is executed in the same scale as the area development plan.

As the plans constitute documents of local law they are the basis for future administrative decisions, i.e. decisions on the conditions of the construction, on the locality of the investment the study of the particular items of the environment especially measurement of noise, air pollution soil pollution etc. have to be executed according to the reference methodology established by the Ministry of Environment. It assures proper quality of information about the environment, and in this way allows specifying the requirements of the environment protection in the plan properly.

The information about the environment must be also included in the report of the impact of the planned project on the environment. The obligation results from a proper decision of the Ministry of Environment, which refers to the establishment of strategic evaluations of the impact of the area development on the environment. A formal system of public documents has been established and it is used in the process concerning the evaluation of impact on the environment with participation of the communities consisting of : design of the area development, report of its impact on the environment and the ecophysiographic study concerning the area for which the project has been established.

Key words: *spatial planning, ecophysiographic study*

## GRASS GIS APPLICATION IN SOUNDSCAPE QUALITY EVALUATION FOR ECOPHYSIOGRAPHIC STUDY PURPOSES

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Ecophysiographic studies constitute vital element in polish spatial planning system. Their purpose is to deliver basic information on space which final use will be determined by spatial plan. In this article we try to present methodology used in several ecophysiographic studies carried out by our team - creating information layer characterizing soundscape quality with GRASS GIS.

Evaluating of soundscape quality within ecophysiographic studies is a task completely different form carrying out typical city acoustic map, basically because of array of differences in the goals that those documents have to serve, and data detail level that authors can access.

Main points touched in this paper are:

- place of ecophysiographic studies in noise environment protection
- opportunity to solve spatial conflicts resulting form acoustic nuisances at the very early stage of environment collecting of noise nuisances data in field
- environmental noise measurement rules in Poland, and their compatibility with EU directives initial measurement data analysis and other information allowing to describe noise nuisance sources more precisely.
- preparing raster data layers for GRASS analysis- using topographic maps
- and aerial photography to extract required data
- environmental noise propagation model - description of the basic factors
- determining propagation of noise in an environment based on ISO 9613 Standard
- noise propagation model implementation in GRASS GIS - application of
- raster analysis modules in noise propagation calculation, limitations
- imposed by used GRASS GIS data structures in implementing all rules
- governing noise propagation
- model verification based on field noise measurements
- modeling results visualization in GRASS
- further development directions
- case studies

GRASS GIS is a full-featured raster Geographic Information System with vector analysis support. It gives users different spatial analysis tools that can be used not only at noise propagation modeling stage, but later also, especially in further analysis of nuisances in relation to other spatial data. In the paper we describe the way we have developed map with zones indicating required noise protection based on norms and acts of building acoustics and environmental acoustics.

Key words: *GIS, grass, noise, ecophysiographic study*

## ASSESSMENT OF THE IMPACT OF THE STRATEGY OF INFRASTRUCTURE DEVELOPMENT IN THE OPOLE VOIVODESHIP BETWEEN 2003 AND 2008 ON THE ENVIRONMENT AS AN EXAMPLE OF MEETING THE REQUIREMENTS OF THE "STRATEGIC DIRECTIVE" OF THE EUROPEAN COMMUNITY

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The public document called Strategy of infrastructure development in the Opole Voivodeship between 2003 and 2008, has been established by the Department of the Infrastructure and Local Development of the Marshall Office of the Opole Voivodeship. It specifies strategic and operative aims within the development of the infrastructure - roads, municipal and electric systems, in order to provide proper standard of living of the inhabitants, proper standards of road connections, railways, telecommunications systems, development of the air and water transport and to improve the state of the environment and provide electricity for the Voivodeship. The realization of the aims increases the attractiveness of the voivodeship for the investors, which in turn, facilitates the development of the local economy. The aims, indicated in the Strategy of development (...) are to integrate the activities of all units involved in the tasks related with the infrastructural development and they will influence obtaining of financial resources from, among others, the budget of the voivodeship self-government, contract between the government and regional organizations and from the
structural funds.

The strategic evaluation of the impact of the above mentioned document prepared by the local authorities on the environment has been established in accordance with the regulations of the Act dated 27.04.2001 Environment Protection Law, which includes formal regulations taking into account the requirements of the EU regulations i.e. the European SEA Directive. In the strategic evaluation of the environmental impact the specified aim and scope of the Strategy (...) includes characteristics of the main premises of the strategy of development of the infrastructure in the voivodeship and relates the strategy with other public documents - especially those which create the policy of a balanced development. Apart from that an analysis and evaluation of the state of the environment and its potential changes in case of no execution of the Strategy (...) has been carried out.

Besides, the state of the environment in the areas of the envisaged significant impact was subject of a detailed analysis and evaluation. Problems of the environment protection in areas of special value, related with mineral resources, landscape and ecological features have also been discussed. Finally, solutions were proposed, aiming at prevention, restrictions or a natural compensation of the negative impact on the environment resulting from the Strategy (...) and alternative solutions for the solutions included in the Strategy (...) were formulated.

Key words: *strategic environmental assessment, European SEA Directive*

## PRACTICAL IMPLEMENTATION OF ENVIRONMENTAL LEGISLATION IN A FIRST/THIRD WORLD COUNTRY

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South Africa is a developing country with environmental constraints emanating from both its first and third world sectors. In order to address environmental impacts on the environment effectively, some form of legislative requirements must be met. Normally this can be achieved through the enforcement of adequate environmental legislation, and/or the use of voluntary approaches through working relationships between governments and industries. In South Africa, environmental legislation comparable to the best in the world has been in existence for a very long time. However, the country's inability to enforce current environmental legislation effectively (mostly through a lack of government capacity), results in detrimental impacts on the environment. The situation is exacerbated through the role played by the third world sector in areas where suitable enforcement of legislation may lead to additional unemployment to accommodate additional expenditures from industries having to meet (more) stringent environmental requirements. This scenario is not unlike in many African and other developing countries. This paper gives a brief outline of existing and anticipated environmental legislation in South Africa, dealing specifically with environmental impact assessments (EIAs). The actual enforcement and implementation of environmental legislative requirements in practice are addressed through typical examples from industry in the country. Finally, suitable legislative implementation and enforcement options are suggested and practical examples used to illustrate effective implementation of environmental programmes.

Key words: *legislation, environment, EIA*

## PROMOTING SUSTAINABLE INFRASTRUCTURE DEVELOPMENT IN CANADA: SOME LESSONS LEARNED FROM PROJECTS SUPPORTED BY INFRASTRUCTURE CANADA

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Developed and developing countries, including Canada, face growing pressures to renew and expand public infrastructure, such as roads, water and wastewater treatment, solid waste disposal, buildings and amenities. For infrastructure development to fully contribute to improved quality of life and economic prosperity, it must be based on principles of environmental sustainability.

Infrastructure Canada, a recently created department of the Government of Canada, manages several national programs that deliver billions of dollars in new investment for sustainable economic growth in urban and rural communities across the country.

This paper examines several projects funded by Infrastructure Canada, including the Vancouver Convention Centre Expansion Project. Some "lessons learned" from environmental assessment and other review process are presented that have assisted the integration of environmental sustainability into project planning and decision-making.

This paper is one of three describing Infrastructure Canada's efforts to promote sustainable infrastructure development. The others describe the institutional context and the development of a program framework through which the department addresses its environmental sustainability objectives.

Key words: *infrastructure, environmental sustainability, Government of Canada, Infrastructure Canada*

## DEVELOPMENTS IN EIA OF NATIONAL HIGHWAY SCHEMES IN THE UK

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The Design Manual for Roads and Bridges (DMRB) Volume 11 provides guidance on environmental assessment requirements for national highway schemes in the UK, combining procedural and technical advice. DMRB Volume 11 was first published in June 1993 with changes in August 1994. Air Quality and Water sections have been revised more recently. Users commended the document and it has had wide and positive application. Volume 11 is the definitive guidance on the environmental assessment of highway projects, but sections of the volume are dated and increasingly risk exposing the national road administrations to challenge. Much has been learned in the ten years of Volume 11's application. At the same time, there have been significant developments in the wider legislative and policy context. These include the introduction of EC Directive 97/11 and other European legislation, and the continuing evolution of good EIA practice. The 1990s saw the development of integrated transport project appraisal methodologies across the UK, where environment has equal prominence with safety, economy, accessibility and integration (inter alia the new approach to appraisal and Scottish Transport Appraisal Guidance). In addition, a greater diversity of project types is now promoted throughout the United Kingdom. Accordingly, Volume 11 is being updated and revised, to re-establish it as the definitive guidance on UK highway environmental assessment consistent with both the business needs of the national road administrations and the requirements of European policy guidance and legislation. The objective of this paper is to outline the emerging direction of Volume 11. The paper will describe the major lessons learned, provide details of the specific issues to be revised and/or updated, consider the developing requirement for flexibility in application and the need for integration with project appraisal, and finally set out brief examples of the range of applications to date.

Key words: *EIA, guidance, highways, transport project appraisal*

## LES EFFETS STRUCTURANTS ET IMPACTS D'INFRASTRUCTURES ROUTIÈRES SUR LA MORPHOLOGIE URBAINE ET LES PAYSAGES : LE CAS DES ENTRÉES ROUTIÈRES À L'ÎLE DE MONTRÉAL

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Beaucoup de recherches se sont penchées sur l'implantation d'infrastructures de transport et leurs prétendus effets structurants sur les territoires. La plupart affirment qu'il n'existe pas de lien de causalité linéaire directe entre l'implantation d'une infrastructure et l'apparition d'effets au sein du territoire traversé : c'est plutôt une réalité complexe qui doit être saisie dans son ensemble, dans sa relation au cadre social, avec ses acteurs et leurs stratégies. Cependant, elles ont surtout adopté une approche économique, avec prédominance des dimensions régionale et interurbaine, comme les changements dans la répartition des activités économiques entre villes et régions , liés à la présence d'infrastructures. Elles traitent peu des impacts des routes sur des zones particulières et sur les paysages urbains. Par ailleurs, ces recherches sont essentiellement des évaluations faites a posteriori, ou ex post. Pourtant les études d'impact

ex ante tentent de prévoir l'impact des infrastructures sur le tissu urbain : l'impact est alors traité en termes de coupure, de vues bloquées et ouvertes, de secteur planifié adjacent à l'infrastructure, etc. Mais la dynamique de structuration mutuelle et à travers le temps des morphologies et des paysages ,d'un côté, et des infrastructures, de l'autre, est absente de l'analyse.

La communication présente les résultats d'une recherche commanditée par le Ministère des Transports du Québec sur les entrées routières à l'Île de Montréal et tente de déterminer comment ces entrées routières s'arriment et structurent le tissu urbain environnant. Elles sont découpées en parcours, sur la base des caractéristiques de leurs abords et du milieu traversé, tant au plan des morphologies architecturales et urbaines qui s'y retrouvent que de l'historique du développement. Les vues qui s'offrent aux conducteurs tout comme aux passagers sont décomposées et qualifiées. Une série de propositions sont mises de l'avant pour , d'un côté, pour corriger certaines situations problèmes et , de l'autre, apporter un appui méthodologique aux futures études d'impact d'infrastructures routières.

Mots clés: *autoroutes, entrées routières, effet structurant, impact, morphologies urbaines, paysages urbains*

## LESSONS LEARNED FROM THE ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT AND MITIGATION PROCESS FOR THE BAKU-TBILISI-CEYHAN (BTC) OIL PIPELINE BETWEEN THE CASPIAN AND MEDITERRANEAN SEAS

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A wide variety of complex and challenging issues were faced in the course of the environmental and social impact assessment and mitigation process for the Baku-Tbilisi-Ceyhan (BTC) pipeline, which will carry crude oil between the Caspian and Mediterranean Seas through Azerbaijan, Georgia and Turkey. The International Finance Corporation (IFC) worked closely with the sponsors and provided leadership in designing a framework and oversight mechanism for the development and operation of the project in an environmentally and socially sustainable manner. The 1760 km pipeline passes through a wide variety of agro-ecological areas and land use types and traverses over 17 700 parcels of land utilized by local households. Key issues include: severely limited regional routing options due to complex environmental, social and political constraints, very sensitive issues concerning possible impacts to unique flora and fauna habitats and to commercially utilized groundwater resources, a complicated land acquisition and compensation program required to address temporary impacts to livelihoods and activities (but no physical displacement) of a very large number of households, exacerbated by complex land tenure systems in all three countries, development of adequate mitigation measures and support for various marginalized and vulnerable groups, including ethnic minorities, women and the elderly, implementation of a major public consultation and disclosure program, and intense scrutiny by stakeholders, press and civil society, including international NGOs. The project has set new regional benchmarks in transparency, environmental and social standards and practices (including a regional review), enhancing development impacts though SME, community and environmental investment programs, implementation monitoring and increased constructive engagement with stakeholders. This paper focuses on the 'lessons learned' in conducting the impact assessment for the BTC pipeline and in developing a comprehensive Environmental and Social Action Plan (ESAP) which details how impacts will be avoided, mitigated or compensated and monitored.

Key words: *Baku-Tbilisi-Ceyhan (BTC) pipeline, environmental and social impact assessment*

## THE CHANGE MANAGEMENT PROCEDURE: LESSONS LEARNED ON THE CHAD/CAMEROON OIL EXPORT PIPELINE PROJECT

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There is a tenuous link between the project description in Environmental and Social Impact Assessment (ESIA) and the "as built" project. Therefore, a mechanism is required to deal with the environmental and social realities of the "as built" project. One such mechanism is the Change Management Procedure. This paper analyzes the Change Management Procedure applied on the Chad/Cameroon Oil Export Pipeline project. The Change Management Procedure is analyzed from several perspectives: (i) the project developer and the financial institutions, (ii) the challenges when the regulatory conditions are weak/non-existent, (iii) operationalizing the Change Management Procedure, (iv) what works and what did not work, and (v) dealing with cumulative effects. The Paper concludes with "lessons learned" over the approximately three-year construction period for this project.

Key words: *Chad/Cameroon Oil Export Pipeline, change management procedure*

## EFFECTIVE PROJECT BASED CONSULTATION WITH FIRST NATIONS

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Engaging First Nations in Effective Project Based Consultation The proposed paper will provide an overview of key aspects of engaging First Nations in effective consultation processes within the context of relatively large transportation infrastructure projects subject to the federal and/or the provincial environmental assessment processes within British Columbia. The paper will discuss consultation within the context of recent changes to both the federal and provincial EA processes in British Columbia. These regulatory changes, in combination with the legal and policy changes brought about by recent case law in Haida and Taku will continue to have a fundamental bearing on the conduct of EA in British Columbia for the foreseeable future. These changes to the application of EA within BC also raise several challenges for project proponents and government regulators in meeting legal/policy obligations to consult with First Nations while at the same time adhering to project priorities, timelines and budgets. This must necessarily be balanced with the very real need to address First Nations needs and interests regarding consultation in a manner that is consistent with the principles set out by the courts and government policy. What this calls for is the establishment of positive working relationships with First Nations that engages them in a substantive way in the project planning, design and review phases of project development. This in turn can raise issues with respect to human resource and financial capacity, and project delivery/approval timelines that present challenges for First Nations, project proponents and government regulators. Within that context, the paper will discuss the following issues: · The basis of the obligation to consult · Implementing consultation within the context of EA generally, and the CEAA and BCEAA more specifically · Consultation Principles or "Best Practices" for engaging First Nations communities in effective project based consultations.

Key words: *First Nations, consultation, environmental assessment*

## CUMULATIVE EFFECT ASSESSMENT FOR PRIVATE SECTOR PROJECTS

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The International Finance Corporation (IFC) is the private arm of the World Bank Group. IFC finances private projects in emerging markets where other financial sources are often unavailable because of potential risks associated with the country or with the project itself. There are numerous instances when IFC considers a prospective project sited in an area already populated by other industries or when a company significantly expands its operations in one area. In these cases IFC requires that a cumulative effects assessment be undertaken. To ensure that IFC-financed projects are implemented with due consideration to the surrounding environment and communities, IFC has developed and systematically applies a number of policies and guidelines that cover potential environmental, health, safety and social issues. IFC's procedure for environmental and social review of projects highlights the need to assess the "cumulative impact of a proposed project and other developments which are anticipated". However, IFC documentation offers no official guidance on how to undertake a cumulative effects analysis. IFC is currently using, on a case-by-case basis, a general CEA guidance note originally prepared for the review of mining and metallurgical projects. It was developed taking into account information provided by specialized publications and IFC's own experience in dealing with large and complicated projects. While this guidance note has been applied successfully in the appraisal of several projects, the author acknowledges that more comprehensive instructions may be necessary. This paper presents an updated version of the CEA guidance note and examples of its use in IFC-financed projects. As IFC is currently developing further guidance on cumulative effects assessment, the author welcomes comments and recommendations. We hope that IFC's efforts in this area may contribute to build impact assessment capacity in emerging markets.

Key words: *cumulative effects assessment, SEA, International Finance Corporation, IFC*

## ACHIEVING REGIONAL SUSTAINABILITY: THE EVOLUTION OF MINE CLOSURE PLANNING IN THE SASKATCHEWAN URANIUM INDUSTRY

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Uranium production in Saskatchewan began in 1953 and has since grown to be the world leading supplier of this energy product. Given the remote location of potential ore bodies, incredible advances were made in mineral exploration and the establishment of mining, milling and transportation infrastructure. Site planning did not include environmental assessment or public involvement. There was minimal to no regulatory controls, and definitely no closure planning. Even financial considerations were secondary, given the strategic importance of uranium at that point in history. Production wastes were routinely dumped on surface or in lakes. Each major operation had an associated town. Ore depletion lead to site abandonment with no decommissioning. This approach has left a legacy with significant environmental and social implications that are being grappled with to this day. In the early days, uranium ore grades were often 0.05% U3O8. Exploration in the early 80's, revealed extensive high grade uranium deposits often exceeding 20+% U3O8. This vaulted Saskatchewan into a leadership role in energy production. This realization presented a number of environmental, occupational health and safety, social and financial challenges. Consequently the industry and the governments of the day rose to the challenge, and initiated a number of initiatives that continue to evolve. This paper will discuss the evolution of sustainable development thought and practice within Saskatchewan's uranium industry. The environmental, social and economic pillars of regional sustainable development will be explored from the perspective of "designing" for site closure. The fundamental components of this approach will be detailed and examples of success shown. The paper will demonstrate that Saskatchewan's uranium industry has learned from past events, and with a strong sense of environmental and community responsibility, has assumed a leadership role on the world stage with regard to closure planning, progressive decommissioning and community involvement.

Key words: *mine closure planning, sustainable development*

## TOWARD GUIDELINES FOR PUBLIC PARTICIPATION BEST PRACTICE PRINCIPLES

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As the premier organization in the field of environmental assessment (EA), IAIA is expected to play a leading and proactive role in the improvement and dissemination of EA concepts and practices, including Public Participation (PP), one of the basic principles of EA. The PP Best Practice document (under-development) is designed primarily for reference and use by those professionally involved in public participation within the context of EA. It promotes the effective practice of public participation, consistent with the institutional and process arrangements that are in force in different countries and organizations (e.g. World Bank), as well as internationally (e.g. Aarhus Convention). Three groups of principles will be presented and discussed: Basic Principles which apply to all stages of PP in EA process from strategic level to operational level, Operating Principles which describe how the PP Basic Principles should be applied to the main steps and specific activities of the EA process, and Developmental Principles which point the way for future development in PP.

This presentation aims to summarize a draft version of the PP Best Practice document which has been developed under the coordination of the authors, in accordance to IAIA priorities, in conformity with IAIA strategic planning for 2003-2004, and following recommendations from PP session participants at IAIA'03 (Marrakech). It will stimulate debates and discussions for the following workshop on this worldwide issue. After this exercise, the authors will produce a revised version of the PP Best Practice document and submit it to IAIA Council for approval.

Key words: *public participation, best practice, guiding principles*

## INDUSTRY AND CIPEC: MAKING PROGRESS IN ACHIEVING KYOTO OBJECTIVES

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Unilever, a global company, produces and markets a wide range of foods, home and personal care products. The Unilever Canada Rexdale plant produces approximately 185 million pounds of edible oil products each year. Products include some of the leading brand name margarines, such as Becel and Imperial.

The presentation describes the comprehensive program implemented to increase energy efficiency at the Rexdale Plant, by reducing use of all energy forms and engaging the employees in these efforts.

- Teaming up with CIPEC and NRCan
- By optimizing the energy performance of existing plant and equipment
- By Setting Performance Targets based on Historical Operating Conditions
- Providing information on attainment of those targets to people responsible for consumptions to allow them to spot wastage
- Setting up a policy of the organization's commitment to energy conservation and the environment
- Creating an organizational structure to facilitate energy management activities
- Motivating people in the organization to treat energy management seriously
- Implementing information systems to fuel monitoring and control functions (M&T)
- Provide needed resources-people with the appropriate knowledge, skills and attitudes-are in place

The achievements in Energy Intensity Reduction from 1999 to 2004 are: Natural Gas reduced 39%, Electricity 24%, Steam 50%, Compressed Air 27%, Water use reduced 52%. The results are related directly to production (per 1000lbs.) so that the same basis for comparison is used from year to year.

In total, the changes required an outlay of $1,524,305 and returned an annual saving of $3,190,241

The team is focused on making energy savings a way of life for all the employees. Energy boards are located in four locations within the plant. Not only do they show off what projects have been implemented, but also congratulate and credit the employees who have contributed to the program.

## ENVIRONMENTAL ASSESSMENT CAPACITY BUILDING - EA TOOL KIT

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The First Nations Environmental Assessment Technical Working Group is comprised of EA Practitioners from First Nations, BC, and Canada. The FNEATWG acts as a resource body on First Nation environmental assessment practices for interested First Nations, First Nation organizations, the Environmental Assessment Office and other concerned agencies and organizations. The FNEATWG is committed to assisting First Nations build capacity to participate in and deal effectively with Environmental Assessments conducted in the province of BC.

To begin to address this important objective the FNEATWG is completing an important project and would like to make a presentation at the conference regarding an important initiative that is intended to assist and enhance First Nations' capacity to deal with and participate effectively in Environmental Assessment conducted in British Columbia.

The resource manual is entitled: *First Nation Environmental Assessment Tool Kit Tool Kit Overview*. The Tool Kit contains comprehensive material to provide First Nations with a concise understanding of Environmental Assessment and some associated technical and decision-making processes.

The Tool Kit is a substantive document (1 -2 large binders) that is intended to assist First Nation to deal with current or future environmental assessment that may be happening in their traditional territories. In particular it provides resources that explain the BC Provincial and Federal Environmental Assessment processes, as well as providing a step-by-step guide to conducting independent EAs. In addition, it provides resources for conducting a traditional use study (TUS) and describes potential funding sources that may be available for participating in EA's or conducting TUSs.

The Tool Kit will be available in March 2004 in Hard Copy and in the latter part of 2004 the web-based tool kit will become available.

## LIENS ENTRE LA RÉDUCTION DE LA PAUVRETÉ ET LA GESTION DE L'ENVIRONNEMENT EN AFRIQUE - LES DÉFIS À RELEVER À L'ACDI AU NIVEAU DES POLITIQUES ET LES OCCASIONS À SAISIR

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La présentation porte sur les mécanismes susceptibles de réduire la pauvreté et de maintenir la croissance dans le cadre du Nouveau partenariat pour le développement de l'Afrique (NPDA) mis sur pied lors du Sommet du G8 qui s'est tenu à Kananaskis, en Alberta, au mois de juin 2002 et du Fonds canadien pour l'Afrique administré par l'Agence canadienne de développement international (l'ACDI). On y définira les liens existant entre la pauvreté et l'environnement et démontrera que de saines et équitables pratiques de gestion de l'environnement sont essentielles pour atteindre les Objectifs de développement du millénaire, en ce qui a trait à l'éradication de l'extrême pauvreté et de la faim, à la réduction de la mortalité infantile, à la lutte contre les graves

maladies, au renforcement des capacités des pauvres, au soutien à la bonne gouvernance ainsi qu' au développement et au maintien d'un environnement durable.

Je me propose de présenter les éléments et les approches susceptibles d'assurer une évaluation de l'environnement durable pour nos partenaires africains. Pour ce faire, je tracerai trois tableaux comparatifs dans lesquels les politiques principales de l'ACDI seront analysées par rapport à leur conformité aux principes du développement durable et aux pratiques en vigueur. Le premier tableau touche à l'évaluation des politiques de l'ACDI portant sur le rôle de l'Agence à la lumière de douze particularités de base inhérentes aux meilleurs processus d'évaluation de la durabilité et à sept principes généraux de durabilité. Le deuxième tableau évalue les politiques de l'ACDI en matière de développement durable et la mise en application de la Loi canadienne sur l'Évaluation environnementale (LCÉE)en vertu des critères mentionnés ci-dessus. Le troisième et dernier tableau étudie les politiques de l'ACDI en regard des six priorités de l'Agence.

Les douze particularités d'évaluation de la durabilité examinées sont: connection, concentration, participation, profondeur et intégration, prise en compte du contexte, largeur du champ d'application, aspects positifs, mise en place en amont, alternatives, suivi, principe de précaution et adaptation, motivation.

Les sept principes généraux de durabilité sont les suivants: intégrité, suffisance et occasions, égalité, efficacité, démocratie et société civile, précaution et adaptation et intégration.

## RÔLE DES POPULATIONS LOCALES DANS LA GESTION DURABLE DES RESSOURCES FORESTIÈRES : STRATÉGIE POUR LEUR IMPLICATION

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Depuis les années 80, le Gouvernement gabonais s'est engagé dans un processus de gestion durable des forêts avec la loi 1/82, dite loi d'orientation en matière des eaux et forêts. La forêt occupe donc une place importante dans l'économie du pays. Récemment intégrée dans le processus de décision suite à l'adoption du nouveau code forestier en décembre 2001, le concept d'aménagement forestier demeure mal compris par certains opérateurs économiques. Les impacts à long terme de l'exploitation forestière ne sont pas bien évalués, notamment ceux liés à la présence de riverains.

Au moment où la prise en compte des populations locales fait l'objet de débats au niveau international, fort est de constater que celles-ci ne sont pas intégrées dans les programmes d'aménagement. Une analyse de la nouvelle loi forestière montre que les aspects relatifs aux droits coutumiers sont incomplets et relativement vagues dans leurs descriptions. Sur le terrain, on remarque par ailleurs que l'implication des populations locales se limite encore à une simple collecte d'informations et non à une volonté de les impliquer véritablement dans le processus de prise de décision. La présente communication vise à présenter les enjeux socio-économiques de l'exploitation forestière dans la forêt gabonaise, principalement ceux liés à la multiplication des conflits, au cadre juridique et institutionnel de gestion du terroir ainsi qu'au manque de transparence dans l'attribution des forêts pour la production soutenue. Pour terminer, des propositions seront faites dans le but d'améliorer les conditions de vie, déjà précaires, des communautés villageoises vivant dans les zones exploitées.

Mots clés : *gestion intégrée des ressources naturelles, populations locales, gestion des conflits, environnement humain*

## PROTECTION OF THE CULTURAL AND ECOLOGICAL HERITAGE—SEISMIC ACQUISITION IN THE MURZUQ DESERT IN LIBYA

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In December 2001, Total E&P Libya started a 2D seismic campaign of more than 3400 km in the desert area of the Murzuq basin in Libya. This large concession (16,500 km2) comprises three types of terrain: plateaux, gravel plains and sand dunes.

Results from the Environmental Baseline Study and from the Environmental Impact Assessment which followed, showed that the environment was very sensitive regarding at least three criteria: the area had endangered fauna and flora, it had a very rich archaeological patrimony, and the landscape was worth be protected. A number of exceptionally rich archaeological sites have been found , most of them dating back to the Neolithic age.

The paper will present the measures taken to minimise the impact of the seismic campaign, which included:

- appointment of archeological and ecological teams of European and Libyan experts
- protection of the archaeological sites, marked and avoided, even to the extent of rerouting lines
- ban of use of dozers were on the Messak Plateau (reg) in order to limit the residual visual impact
- special attention brought to waste management

- restoration of lines and camp sites, using chains and roller in order to minimise the activity footprint
- post-activity assessment

The paper will discuss the effectiveness of these measures, which proved to be efficient, and demonstrated the importance of early EBS and EIA to identify the key issues and take the correct mitigating measures which made this seismic campaign successful.

## GOUVERNANCE ENVIRONNEMENTALE : EXAMEN CRITIQUE DU NEPAD ET DES DSRP

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Contexte. La réflexion et le cadre conceptuel du développement de l'Afrique ont de nouveaux noms serait-on tenté de dire. Au plan continental, le NEPAD a été adopté par les Chefs d'Etats membres de l'Union Africaine (UA) en Juillet 2001 et au plan national, un certain nombre de pays sous la houlette des institutions financières internationales ont élaboré ou élaborent leur Document de Stratégie de Réduction de la Pauvreté (DSRP).

Ces deux documents ont entre autres, trois caractéristiques communes :

- Ils visent exactement les mêmes objectifs à savoir éradiquer la pauvreté en Afrique et réaliser in finé les Objectifs de Développement du Millénaire (ODM) des Nations Unis.
- La réflexion sur le développement qui y est conduite, n'est pas cantonnée, comme cela a été longtemps le cas, à sa seule dimension économique, mais s'intègre aussi aux autres sphères ayant un impact direct sur la qualité de vie de l'Homme.
- Les préoccupations environnementales y sont explicitement prises en compte.

Ces préoccupations environnementales qui y sont exprimées, s'appuient entre autres sur un certain nombre d'affirmations fortes au plan continental, et sur un cadre législatif et réglementaire plus ou moins pertinent au plan national.

Problématique et Objectifs du Papier. La Gouvernance environnementale comprise comme l'ensemble des bonnes pratiques en matière environnementale, a pour base, les institutions, les législations, les textes réglementaires, les structures de formation. Quel est l'état de cette base ? Cette base permet-elle dans le contexte actuel de faire des préoccupations environnementales un des piliers du NEPAD et des DSRP suivant des normes internationalement admises ?

Méthodologie. Il s'agira essentiellement d'examiner le contenu du NEPAD notamment la priorité sectorielle B4 relative à " l'Initiative Environnementale ", et d'un DSRP. Nous avons choisi celui du Cameroun et ce pour deux raisons :

- Il est bien connu par l'auteur
- Le Cameroun a achevé le processus d'élaboration du DSRP et le document final a été présenté en Juillet 2003 aux Conseils d'Administration de la Banque Mondiale et du FMI.

Le chapitre 3.5.3.3 du DSRP du Cameroun est consacré à l'Environnement.

Conclusion. De cette analyse, seront tirées des conclusions devant permettre d'ouvrir le débat sur le " Comment " du renforcement de la dimension environnementale du NEPAD et des DSRP afin de faire des préoccupations environnementales un des sujets transversaux majeurs du Développement et de permettre une meilleure gouvernance environnementale sur le continent africain.

## DES EXPLOITATIONS MINIÈRES LIÉES AUX PROBLÉMATIQUES ENVIRONNEMENTALES AUX PROGRAMMES ROUTIERS, LE RÔLE DU WWF DANS DEUX DOMAINES FIGURANT PARMI LES PRIORITÉS DU NEPAD

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Depuis 1998, période de découvertes de nombreux gisements de saphir dans plusieurs endroits de la Grande Ile, Madagascar est confronté aux problèmes environnementaux causés par des exploitations anarchiques de cette pierre précieuse. Dès le commencement de ce phénomène, le WWF a figuré parmi les premières entités à manifester ses préoccupations, à conduire des réflexions et à proposer des actions.

En 2003, la Délégation de l'Union Européenne à Madagascar a mandaté le WWF pour assurer le contrôle-qualité des études d'impact environnemental réalisées dans le cadre de son programme de construction et de réhabilitation de certaines routes nationales malgaches.

Dans ces deux cas différents, l'objectif du WWF a été toujours de contribuer à la concrétisation de l'intégration de la dimension environnementale dans les programmes d'investissements. Ce, d'autant plus que la reconstruction et la réhabilitation des routes, ainsi que l'encouragement aux divers investissements sont parmi les priorités du Gouvernement actuel.

A partir de ces deux exemples, notre communication traitera deux des dix priorités du NEPAD - environnement et infrastructures - et fera le lien avec la mission du WWF.

Pour le WWF à Madagascar, après la mise en œuvre du texte portant sur la Mise En Compatibilité des Investissements avec l'Environnement (décret MECIE), l'heure est maintenant de susciter les promoteurs de conduire des EIE de qualité, et d'inviter les entreprises anciennement installées et qui n'étaient pas encore soumises aux réglementations actuelles, à se mettre en conformité.
Bref, de ne pas considérer le décret MECIE sous un aspect coercitif, mais comme un levier figurant parmi les outils de développement.
Que le développement durable allant de pair avec respect de l'environnement ne reste pas un vain slogan, mais qu'il soit une politique à mettre concrètement en œuvre au sein des entreprises d'une part, et élargie au niveau régional et national, d'autre part.

Mots-clés : *politique, dimension environnementale, mecie*

## LA DESTRUCTION DES ÉCOSYSTÈMES FORESTIERS DE LA PROVINCE DU BAS-CONGO (RÉPUBLIQUE DÉMOCRATIQUE DU CONGO)

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Le Bas-Congo regorgeait et regorge encore un écosystème forestier riche. Sa destruction est liée à plusieurs causes humaines : pressions économiques, sociales, politiques, gestion des ressources naturelles.

Les facteurs contribuant à des pressions anthropiques sur les écosystèmes sont : accroissement démographique, pauvreté extrême et répandue, productivité agricole médiocre, pollution sociale et morale, occupation anarchique du sol, agriculture non sédentaire, abattage des arbres

Actuellement, le défrichage de forêts au profit de l'agriculture itinérante et le prélèvement des combustibles ligneux pour des besoins humains constituent la principale cause de destruction forestière.

Le besoin agricole, en bois de construction, bois d'œuvre, bois de feu vide les forêts galeries de leur contenu facilitant la destruction des espèces vivantes , phénomènes perceptible dans les territoires de " CATARACTES " .

Le District de LUKAYA n échappe pas à la destruction de la biodiversité car l'exploitation de forêts a détruit les pouvoirs d'auto générateur et auto-épurateur de ces écosystèmes laissant de recrue forestière s'épuisant par la carbonisation de combustibles ligneux.

L'exploitation irrationnelle des écosystèmes aboutit à la destruction des niches écologiques des espèces végétales et animales menacées de destruction.

Ceci représente une atteinte à la biodiversité, particulièrement aux protéines animales faisant défaut au Congo.

A long terme, la déforestation, conduira à la désertification des sols et à une modification catastrophique des régimes des eaux. Nous constatons au Bas Congo, la sécheresse, la pénurie des produits forestiers ne satisfaisant plus les besoins quotidiens des populations en nourritures suite à la disparition des produits végétaux, animaux et espèces médicinales.

Toute l'économie rurale est déstabilisée et la vie des hommes n'est plus qu'une lutte pour la survie. Le Nekongo reste bloqué dans la pauvreté.

Bref, la vie dans le Bas Congo devient incertaine, précaire, à cause de la rupture d'équilibre entre l'arbre, le sol, le climat et les activités humaines.

Mots-clés : *ecosystèmes, biodiversité, espèces végétales et animales*

## L'IMPACT DE LA PRODUCTION DE CHARBON E BOIS DANS LA COMMUNE DE LEMBA

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Les combustibles ligneux qui entrent dans la commune de Lemba à Kinshasa, y arrivent par route et / ou éventuellement par rail. Ils proviennent essentiellement de la province du Bas Congo et celle du Bandundu , Leur transport est une activité très rémunératrice.

Dans cette commune, une personne brûle mensuellement 15 kg de bois de chauffe et 10,5 kg de charbon de bois, engendrant des problèmes de survie dans les ménages. Les besoins en combustibles ligneux sont respectivement de 31.223 et 720.000 tonnes de bois de chauffe , de 21.856 et 504.000 tonnes de charbon de bois pour Lemba et Kinshasa et occasionnent certaines conséquences.

1. Impact de consommations des combustibles ligneux sur les budgets familiaux
Leur impact sur les budgets familiaux est très considérable. En effet, un ménage qui consomme 2 tas de charbon de bois

par jour dépensait zaïres deux millions en 1993, par jour. C'est une dépense énorme à la quelle les masses laborieuses avaient du mal à faire face à cause de leur pouvoir d'achat très faible.

2. Impact de consommations des combustibles ligneux sur l'environnement
Sur le plan environnemental, il existe une série des conséquences néfastes. Celle-ci se manifeste par la disparition des certaines espèces végétales et animales corrélatives à la destruction des niches écologiques, la modification du climat, des précipitations, l'érosion du sol, la perte de fertilité du sol, la réduction de l'infiltration qui provoque l'augmentation du ruissellement qui, à son tour, peut entraîner les inondations...

Concernant le déboisement provoqué par les besoins en bois de feu à Lemba, l'exploitation forestière, comme pratiqué dans les zones de productions de combustibles ligneux engage ces zones pourvoyeuse dans une série régressive " forêt- savane- steppe- désert "Les espaces forestiers exploitée sont actuellement remplacé par les savanes. La savanisation liée à l'action anthropique

Mots-clés : *combustible ligneux, charbon de bois, déforestation*

## LE NEPAD ET LE CONFLIT ARMES EN RDC

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Depuis le 02 août 1998, le Congo Démocratique était victime d'actes d'agression et d'occupation de la partie Nord-Est de son territoire par les troupes étrangères alliées aux forces rebelles.

De ce fait, les Congolais avaient manifesté leur opposition par des résistances non armées et armées.

Pour affaiblir cette résistance, les occupants avaient mis en place de stratégies de destruction des espèces végétales, animales, humaines, et écosystèmes.

Ces contextes de violences généralisées entraînaient et continuent à entraîner plusieurs conséquences aux pays.

L'Evaluation environnementale en cas des Conflits Armés est souvent axée sur plusieurs domaines entre autre, le droit, l'économie, le social, la culture, les ressources naturelles, l'environnement...

Parmi les impacts des conflits sur l'économie et le social, nous épinglerons en RDC les violations, les massacres, les arrestations, fermetures d'usines, disparitions d'entreprises, débrouilladismes, chômages.

Les impacts sur l'environnement sont entre autres : menaces et déséquilibre de la biodiversité, destruction des écosystèmes, parcs, braconnages, l'exode incontrôlé, érosions.

Quant aux impacts de la guerre sur les personnes vulnérables, nous citerons le viol, harcèlement sexuel, assassinat, viol exercé sur les femmes congolaises avec mobil la transmission du VIH /SIDA et maladies sexuellement transmissibles, mutilation des femmes enceintes, enterrement des femmes vivantes, massacres des enfants, spoliation des biens de vieillards.

Il existe aussi les impacts de la guerre sur les ressources tel est le cas de pillage des minerais, des bois d'œuvre, des exploitations forestières produits agropastoraux, faune et flore en détruisant le réserve.

Le NEPAD par le biais des organismes internationaux a facilité l'installation de la paix et la sécurité au Congo, en introduisant la bonne gouvernance, la démocratie,la transparence car la population était marginalisée, pauvre et en retard du développement.
Actuellement, les secteurs éducationnels, sanitaires et énergétiques reçoivent des essors considérables.

Mots-cles : *NEPAD, agression, impact, pillage, massacre, déséquilibre de la biodiversité, braconnage*

## SOCIAL IMPACT ASSESSMENT IN URBAN PLANNING

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The purpose of this paper is to analyse the content and importance of social impact assessment (SIA) in urban planning in Finland. In Finland the new Land Use and Building Act, which came into force on 1.1.2000, brought impact assesment as an integral part of urban planning. At the same time, the new legislation strengthened the requirements for procedural openness and communication.

SIA can be defined as a systematic effort to identify and analyse social impacts of a proposed project or plan on the individual, on social groups within a community, or on an entire community in advance of the decision making process. Social impacts of urban plans refer to various factors such as quality of housing, local services and living environment, experienced health and security, people's ways of life, gentrification or segregation, conditions of transportation etc.

It is implicit that social and biophysical impacts (and the human and biophysical environments) are interconnected.

The paper analyses the possible role of SIA in different land use plans in Finland and the revelevant contents of this impact assessment in various planning contexts (such as urban waterfronts, new housing areas, etc.). In addition, the paper presents a typology of various factors (dimensions of impacts) for different scales of urban planning. It is important to understand what kind of impact typologies are relevant in various scales of planning such as detail plans, general plans or regional plans.

Key words: *social impact assessment, urban planning*

## PSYCHO-SOCIAL MONITORING OF AN INDUSTRIAL ACTIVITY

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This presentation concerns the psycho-social monitoring of an industrial activity, performed in 2003. Results from this monitoring (time 2 &#8211, t2) are compared to the data collected for the environmental impact assessment study conducted in 1998 (time 1 &#8211, t1), prior to the construction of the facilities. The goal is to illustrate the way local people&#8217,s evaluation of, and adaptation to, outputs of industrial activity (such as pollution) evolved through time. 200 residents at t1, and 600 at t2, answered a phone survey where they expressed their attitudes, perceived risk and control towards industrial activity.

The t2 results reveal a surprising pattern considering the environmental stress theory (e.g., Palma-Oliveira, 1992, Lazarus & Folkman, 1984), especially the findings regarding comparisons between these results and those obtained at t1. First, the t1 attitude towards local pollution is more positive than the one found for national pollution, which is predicted by environmental stress models. However, the opposite pattern was found at t2. These results suggest that whereas in t1 participants were engaging in social comparison (e.g. Taylor, 1983), in t2 this adaptation strategy ceased to be implemented, which is further supported by the almost insignificant difference found between the t2 perception of risk to self and to others, both high. However, as the perceived risk raised, so did the perceived control, which seems to be an apparent paradox!

An explanation for this finding was presented by Prince-Embury (1992, Prince-Embury & Rooney, 1987, 1989) who hypothesized a dissociation process between risk perception and control. This would enable people to adapt to an aversive situation as they would be able to nurture a sense of control and mastery despite the risk they perceive. This is supported by the fact that whereas at t1 these variables were found to be correlated, such association was not found at t2.

Key words: *psycho-social monitoring, environmental stress, adaptation, perceived risk, perceived control*

## PSYCHOLOGICAL AND PHYSICAL DETERMINANTS OF NOISE ANNOYANCE: THE INTERACTION BETWEEN CAR AND TRAIN

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A field study which analyses the predictability of noise annoyance either by physical characteristics of the stimuli (train and car noise) and by individual psychological characteristics (e.g. cognitions towards the stimuli) will be presented.

In an urban area of Lisbon, 7 points of noise measurement were selected. On each point, noise was measured objectively during day and night and characterized in terms of car noise, train noise, plane noise and global noise. Moreover, the nearby residents were interviewed by psychologists who filled a questionnaire which measured noise annoyance* (global, train and car noise annoyance), attitudes towards the train*, neighbourhood identity*, the practice of coping strategies, health problems and anxiety (STAI- Spielberger State and Trait Anxiety Inventory). Regarding psychological data, the results were the following: 1) there were no differences between train noise annoyance and car noise annoyance for each place, 2) the night train noise was more strongly related with the train noise annoyance than the day train noise, 3) residents showed low average of annoyance related to the train, but there were differences between places, 4) there was a negative correlation between attitudes towards the train and train noise annoyance, 5) people who

love the train don't use coping strategies as much as the ones who dislike it, 6) when the annoyance is higher there is an increasing in coping strategies, even if in average people don't use much coping strategies, 7) health problems are mainly related with night measures of noise, 8) it wasn't found any relation between anxiety (trait or state) and noise annoyance.

The main predictors of annoyance were identified after a Forward Stepwise regression analysis, which allowed us to develop a model to explain train noise annoyance. The major determinant of train noise annoyance was the attitude towards the train.

This study was developed for REFER - Rede Ferroviária Nacional

* scale with psychometric validation

Key words: *transport's noise, noise annoyance, physical characteristics of noise, psychological determinants of noise annoyance, train noise annoyance model*

## THE DEVELOPMENT OF AN INTEGRATED MITIGATIN PROGRAM FOR THE PROTECTION OF THE OSPREY WITHIN THE LOW-LEVEL TRAINING PROGRAM AT GOOSE BAY, LABRADOR

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Over the past six years, the Institute has succeeded in developing with DND and the approval of the Institute board members a comprehensive mitigation program to ensure the protection of the Osprey within the low-level training area.

The EIS indicated a wide distribution of osprey in Labrador with densities varying according to habitat and ecoregions with the highest densities being situated along transmission lines. Although a complete census has not been completed an annual nest distribution database was maintained since 1994. A review of the data for 1998 showed 287 active nests within the 150,000 km2 training area. Trends since 1994 indicated that nest activity/occupation appeared relatively consistent with reproductive success peaking every 4-5 years.

In 1994 behavioural studies were initiated to assess reaction to jet aircraft activity and no significant differences were documented before and after over flights. The results of a 1996 study found no relationship between exclusion zone size and reproductive success. In 1997 and 1998 reproductive success was measured by manipulating block treatments in control and treatment areas with no significant differences demonstrated.

The impact of natural factors such as weather, nest stability, predation and human influences such as DDT, military activity, forest harvesting, road construction, and hydroelectric development were collated and analysed in this study.

Conclusions. As a result of the concerns expressed by the aboriginal communities the EIS indicated that osprey nest within the training area should be protected by a 2.5 nm avoidance criteria, due to the large number of nests this caused some serious problems in terms of delivering the training program. Following a review of the data which had been collected since 1994 the IEMR board agreed that:

a) the 2.5 nm avoidance criteria closures could be lifted as the data demonstrated that there is a stable, healthy osprey population both within and outside the training area..
b) IEMR will ensure an annual monitoring of a representative sampling of active nests both within and outside the training area in order to detect any variances.

Key words: *Osprey, consensus decision making, military training, aboriginal issue, noise disturbance, mitigation program*

## SEA AND THE GHANA POVERTY REDUCTION STRATEGY

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This paper will expand on the work described in 'Building Capacity in SEA in Sub-Saharan Africa' presented at IAIA 2003, Marrakech, by the same author.

The SEA of the Ghana Poverty Reduction Strategy constitutes the first known application of SEA to a national poverty reduction strategy (there are over 40 such strategies worldwide). Its aim is to mainstream consideration of the environment within poverty reduction policies, plans and programmes in Ghana. The SEA has been conducted at two levels, involving a detailed appraisal at national level of over 400 policies representing the programmes of 30 Ministries, Departments and Agencies. These national sector studies have been paralleled by the sustainability appraisal of all but two of the 210 District Assembly Medium Term Development Plans. The paper will describe the underlying concepts, approach, methodology and outputs.

Key words: *strategic environmental assessment, policy appraisal, poverty reduction, sustainable development*

## CLARIFYING THE SCOPE AND MEANING OF INTEGRATION, INTEGRATED ASSESSMENT AND SUSTAINABILITY ASSESSMENT

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The terms 'integrated assessment' and 'sustainability assessment' (and variations of these terms) are commonly used in the literature promoting the use of impact assessment as a sustainable development (SD) tool. They are used synonymously by some authors, but others use them to, for example, distinguish between enhanced forms of traditional impact assessment and newer SD-directed assessment techniques. 'Integration' is a popular theme within these discussions and it is used to label a wide variety of (desirable) characteristics of the assessment processes.

A number of researchers have explored the scope and meaning of integration and one or more of the assessment types, however they have mostly focussed on developing their own interpretations and definitions rather than on reconciling and clarifying what others have already proposed. The resulting wide range of meanings attached to terms such as 'integrated assessment' and 'integration' is tending to erode their usefulness.

This paper will firstly aim to present a framework for clarifying the scope and inter-relationship of the main 'integration components' described in the literature. Secondly, it will attempt to reconcile the broad range of emerging approaches to SD-directed assessment and to overcome the somewhat inconsistent use of terminology by demonstrating that the various interpretations can be located within a spectrum defined by the following key axes: i) The extent to which an SD scope is covered. ii) The degree of alignment or combination of the tools used. iii) The focus of the assessment.

It is hoped that the clarification provided by these frameworks will encourage constructive further debate on the basis of substance rather than semantics.

Key words: *integrated assessment, sustainability assessment, integration*

## INCORPORATING WEATHER AND CLIMATE FORECASTS INTO ENERGY PRODUCTION AND MANAGEMENT: ECONOMIC BENEFITS, IMPACT ASSESSMENTS, AND POWER INDUSTRY APPLICATIONS

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This session will examine the effects of weather and climate variability on energy production and management, and the potential economic benefits of using climate forecasts in the energy sector's decision-making. The energy industry already uses weather forecasts to plan operations a few days ahead. However, many slower evolving climate phenomena also have impacts on the energy industry, on timescales from seasons to decades. The skill and applicability of these forecasts to the energy industry will be shown. Novel methods for evaluating the impacts (economic, environmental, social, among others) of using this forecast information will be presented. Results from case studies suggest that skillful forecasts can enhance overall economic performance, reduce environmental impacts, and improve energy reliability and security. Through detailed case studies involving power generating organizations, energy distributors, and government agencies, the effects of weather and climate variability on the energy sector have been calculated, using load forecast models and evaluations of load forecast error associated with specific weather and climate events. The case studies include irrigation pump loads, sea-breeze effects, advance scheduling of load demand management events on hot summer days, and hydropower generation. These studies employ forecasts for varying lead times (e.g., 0-7 days, 0-14

days, seasonal), different protocols (e.g., ensemble forecasts), and different weather and climate events, resulting in an overall evaluation of the benefits and costs to the energy sector. In addition to translating the forecast information into economic net benefits, results from these studies can be used in environmental and sustainability measures as increases in the efficiency of energy production and distribution can decrease adverse impacts on the environment. The session will focus on the following areas: (1) case studies, (2) impact assessments and methodologies, and (3) lessons learned.

Key words: *power industry, weather forecasts, load forecasting, environmental impact, delta breeze*

## THE ELECTRICITY SECTOR: ENVIRONMENTAL COMMITMENT AND RESPONSIBILITY

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The Environmental Commitment and Responsibility (ECR) Program was launched by the members of the Canadian Electricity Association (CEA) in 1997 as an industry wide approach to addressing environmental performance and sustainable development. The founding goal of the ECR Program was a commitment by members to develop and implement an ISO 14001 compliant EMS by December 31, 2002. To highlight the industry's commitment to this goal and the stewardship spirit of the ECR Program, participation became a mandatory requirement of CEA membership in 1998.

Each year, the annual ECR Report captures the industry's priorities while providing quantitative and qualitative measures of success. In 2004 the Program continues to focus on the industry's progress with developing smart policy solutions through a partnership approach with government to address key issues such as the promotion of energy efficiency and habitat stewardship. By offering stakeholders a snapshot of the industry's sustainable development efforts, the ECR Program strives to provide industry, governments and policy makers with a clear and accurate picture of sustainable development priorities and challenges. For more information on the ECR Program, please visit www.ecrprogram.ca.

## CIPEC, CLIMATE CHANGE AND THE FOREST PRODUCTS INDUSTRY

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Canada's forest products industry is a key contributor to the wealth and well-being of Canadians. The industry is the largest industrial sector, operating across the country. Equally important is how the industry makes this substantial economic contribution. The industry's social licence to operate demands sustainable management of Canada's forest resources. The industry has come along way and is now lauded for its actions. A perfect example is the pulp and paper's sector proactive efforts on energy management and climate change. This presentation will outline how innovative energy management within the forest products industry has led to significant environmental and economic benefits, and the challenges in making further improvements.

Voluntary action is commonplace within the industry. Whether it's acting early on climate change or signing with the federal government the first industry climate change Memorandum of Understanding, the forest products industry is going beyond. It is also why the Forest Products Association of Canada (FPAC) participates in the Canadian Industry Program for Energy Conservation (CIPEC). CIPEC has assisted the industry achieve its energy objectives and has showcased individual company achievements.

Involvement in CIPEC is now helping the industry continue its impressive track record. For example, benchmarking studies, currently underway, will highlight best practices in the industry and identify opportunities for further improvement. The next step will be to realize those opportunities. Unfortunately, the industry faces what has been called an economic "Perfect Storm", which has put severe constraints on capital investments, forcing a much shorter investment horizon than what is typically required for energy project investments.

## MANAGING LARGE MULTIDISCIPLINARY, MULTICULTURAL EIAS

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Managing large Environmental Impact Assessment Studies (EIAs) can be very challenging. Typically, it involves the integration of numerous (often hundreds) specialists from different organizations, countries and cultures who speak different languages.

Golder Associates prepared a major EIA for the Alto Chicama Project for Minera Barrick Misquichilca. The Alto Chicama Project consists of an open pit gold mine that will be developed in the northern Andes of Peru. The Project is located in the Western mountain range of the Peruvian Andes at an approximate altitude of 4,150 m above sea level (masl). The gold will be recovered using a heap leach process. Based on current reserves, it is expected that the Project will operate for a period of eight to ten years. It will employ approximately 2,000 people during construction and 600 people during operations.

The preparation of the EIA involved the participation of 11 different companies and/or Golder offices from Peru, Canada, USA and Chile. With a total of about 250 persons involved with the project, logistical planning issues were critical to scheduling success. Translation of technical assessments, baseline documentation, background information and preparation of the draft reports in two languages was a significant issue. Other detailed planning issues included identification of key issues for the project, planning baseline studies given natural hydrological and biological annual cycles, and planning a comprehensive stakeholder consultation program. The success of this project was based on the team work of highly qualified professionals and technical personnel able to work across cultures.

An overview of the EIA will be presented with an emphasis on process and management related issues. The paper presents how cultural barriers were overcome and what administrative/ management measures were implemented to make the project a success. This presentation will help other teams to efficiently prepare large, high quality EIAs.

Key words: *EIA, mining environmental*

## PREPARING FOR A SUSTAINABLE MINING DEVELOPMENT: THE CASE OF MAURITANIA (paper and poster)

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In 1999, with World Bank support, Mauritania implemented a Mining Sector Capacity Building Project. The aim of this project is to strengthen the government's capacity to facilitate and regulate activities and increase private investment in the sector. This will provide a sound basis for exploitation, over the years, of the country's mineral resources potential. Although mining development means economical growth, it also means dealing with environmental and social impacts and issues that are often complex and reach beyond the bounds of the mining sector. In a fragile environment such as Mauritania, mining development might induce incredible pressures on resources because of large shifts in population and a clash of the use of resources. This is the case of water which, more than any other resource, is an essential component for the preservation of existing activities and the development of new ones, and which is a vulnerable resource in this country at the limit of the Saharan and sub-Saharan zones.

At the outset of the project, the Ministry of Mines and Industry (MMI) was quite unfamiliar with these problems. Everything had to be done to assure an appropriate environmental and social framework and management, as sustainable as possible, for the valorization of the non renewable mineral resources. Environmentally and socially speaking, how did the MMI prepare to address these issues within the framework of the project? What were the objectives and expectations regarding the environmental facets? What were their contents? To whom was it addressed? What are the main conclusions to be drawn from the work undertaken? Where does the environmental process now stand? What are the next steps? These are the main questions this conference will discuss.

Key words: *social and environmental impacts, environmental management, capacity building, mining sector, Mauritania, World Bank*

## ENVIRONMENTAL FOLLOW-UP AND MONITORING AT CANADA'S NATIONAL ENERGY BOARD

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The National Energy Board (NEB) regulates the construction and operation of interprovincial and international pipelines, the construction and operation of international and designated interprovincial power lines, and oil and gas activities on frontier lands and offshore areas not covered by federal/provincial management agreements. The NEB primarily carries out its duties under the National Energy Board Act (NEB Act), the Canada Oil and Gas Operations Act (COGOA) and the Canadian Environmental Assessment Act (CEA Act).

Environmental follow-up as contemplated under the CEA Act, may differ from environmental monitoring under the NEB Act. A rationale for the distinction between follow-up and monitoring is explained. A follow-up program is considered by the CEA Act as "a program for verifying the accuracy of the environmental assessment of a project and determining the effectiveness of any measures taken to mitigate the adverse environmental effects of the project." Monitoring activities under the NEB Act may overlap with CEA Act follow-up activities. However, monitoring activities under the NEB Act tend to be less issue-specific and focus on the ability to address environmental issues should they arise during project development (i.e., construction and operation). Therefore, the goals of NEB Act monitoring programs often emphasize practical or operational environmental issues, but are strongly complementary to the goals of CEA Act follow-up programs.

Regulated-companies can meet the requirements of both Acts as they design both follow-up and monitoring for federally regulated pipelines in Canada. Examples of environmental follow-up and monitoring programs which have occurred on NEB-regulated projects, will be discussed.

Key words: *environmental follow-up, environmental monitoring, energy regulation*

## IMPACT OF SCHOOL CONSTRUCTION PROJECTS BY CANADIAN NGOS IN NICARAGUA

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This paper presents findings by the author while doing research on the impacts of school construction projects in Nicaragua.

There is a shortage of schools in Nicaragua. Because of this, volunteer organizations build schools there. In recent years the necessity of education has emerged as an important requirement in the prevention of poverty. A basic education enabling people to read, write and do simple arithmetic is a powerful tool in equipping people to care for themselves and their families. It enables them to get a job, do some entrepreneurial work, figure out the simple things in life, and make better use of indigenous knowledge. The first requirement of education is the desire to attend school, and the second requirement is the presence of a primary school in the community.

First, an analysis of the objectives, methods and processes of Canadian NGOs working in school construction projects in Nicaragua was done.

Secondly, the positive and negative impacts of school construction projects on families and the local community in Nicaragua were identified and analyzed.

Thirdly, the positive and negative impacts of school construction projects by Canadian NGOs on Canadian volunteers were identified and analyzed.

Fourthly, the causes of the positive and negative impacts of school construction projects on families and the local community in Nicaragua with a particular focus on participation were examined and explained.

Lastly, recommendations for action by Canadian NGOs and local communities and families with respect to mitigating negative impacts and reinforcing positive impacts of school construction projects were made and given to the Canadian NGOs.

Key words: *impacts of school construction, development, Canadian NGOs, Nicaragua*

## IMPACT ASSESSMENT IN THE CONVENTION ON BIOLOGICAL DIVERSITY AND OTHER MULTILATERAL ENVIRONMENTAL AGREEMENTS

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The Convention on Biological Diversity (CBD), in its Article 14, recognizes impact assessment as a tool to promote the sustainable use of biological resources. Accordingly, Parties to the Convention are requested to introduce appropriate impact assessment procedures and legislation to avoid or minimize adverse impacts of projects, programmes and policies on biological diversity. In decision VI/7-A, the sixth meeting of the Conference of the Parties held in 2002 adopted guidelines for incorporating biodiversity-related issues into environmental impact assessment legislation and/or process and in strategic environmental assessment. These guidelines focus on the screening and scoping stages and are being further developed to incorporate all stages of impact assessment. The International Association of Impact Assessment is a key partner in this process and, in

collaboration with IUCN-The World Conservation Union, a regular dialogue with the private sector is being held.

The CBD guidelines on biodiversity and impact assessment relate to all types of ecosystems and species and are therefore relevant to more specialized multilateral agreements. Accordingly, by Resolution VIII.9 the eighth Conference of the Parties to the Ramsar Convention on Wetlands also adopted the same guidelines, with supplementary guidance to assist Ramsar Parties in their application to impact assessment on wetlands. In accordance with resolution 7.2, the Convention on the Conservation of Migratory Species of Wild Animals is currently undertaking a review of existing international guidance on impact assessment with a view to developing guidelines which take into account possible impediments to migration, transboundary effects and impacts on migratory patterns and ranges.

In addition to the EIA guidelines developed in accordance with Article 14 of the CBD, the Ad Hoc Open-ended Working Group on Article 8(j) and related provisions has developed draft voluntary guidelines for the conduct of cultural, environmental and social impact assessments regarding developments proposed to take place on, or which are likely to impact on, sacred sites and on lands and waters traditionally occupied or used by indigenous and local communities. These are being considered by the seventh meeting of Conference of the Parties to the CBD in February 2004.

## MAINTAINING BIODIVERSITY AND A STEWARDSHIP ETHIC - DIARY OF A HYDROELECTRIC COMPANY

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BC Hydro, a provincial Crown corporation, is Canada's third largest utility and is among the leading producers of hydro electricity in North America. The mission of the company is to provide integrated energy solutions to customers in an environmentally and socially responsible manner. By continually improving performance across the three bottom lines BC Hydro's goal is to become one of North America's leading sustainable energy companies. The challenge is to find effective ways to minimize the environmental effects of operations and still meet the responsibility to supply low-cost electricity to customers. Finding this balance is not easy or inexpensive. The size of BC Hydro's hydroelectric system and the many different biological, geological and climatic zones found in British Columbia require BC Hydro to continually plan and to undertake a variety of programmes and initiatives that maintain biodiversity and encourage stewardship efforts in its areas of operation. As the electricity company serving most of BC, BC Hydro is committed to protecting and enhancing biodiversity, sustaining resources for the long term and finding a balance between competing interests for water use. A selection of the programmes designed to achieve these commitments in partnership with local communities, governments and environmental groups will be discussed in the presentation.

## POTENTIAL IMPACTS OF A CONFERENCE: THE 2004 IAIA REVIEWED

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A team of graduate students from the University of Calgary's Faculty of Environmental Design is invited to undertake an Environmental Impact Assessment of the IAIA 2004 conference in Vancouver B.C. The aim of the assignment is to learn the process of impact assessment and simultaneously suggest ways to reduce the environmental impact of the conference. The resulting assessment focuses on what the team deemed to be the most important 'effects', or attributes of the conference that cause impacts. These are broadly categorized as: mobility related impacts, resource consumption and waste. The summary that will be presented suggests mitigation measures and recommendations for future 'green meetings'. An overview of the Green Leaf program and ideas for auditing conference venues on their environmental performance is added for consideration.

While the students gain awareness about specific environmental impacts of tourism in an urban setting, they also uncover conceptual and methodological issues: For example, does accentuating positive aspects of the conference amount to environmental trade-offs? Can resource conservation, as emphasized by the approach of the Green Leaf program, be quantified and its relative magnitude adequately understood? How can we make estimates of avoided material use? Avoided land use, avoided water and energy use, avoided air emissions? Given these challenges, how to we suggest appropriate mitigation measures? The students grapple with the issues while coping with short timelines and on student budgets.

Key words: *green meetings, resource consumption, tourism, urban*

## CLIMATE CHANGE IMPACTS ON ELECTRIC AND NATURAL GAS UTILITY ASSET OPERATIONS AND COSTS

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This paper will demonstrate the practical value of applying climate science and modeling to electric and natural gas utility load and energy forecasting, and then applied to utility asset planning over a long term. The study is based on an earlier completed San Diego Regional Energy Infrastructure Study, which was completed in January 2003. The study

reports on the completion of a long-term climate forecast and identifies the seasonal temperatures and precipitation variations for a 30-year period. Then, the seasonal temperature changes are applied to electricity and natural gas energy forecasting and infrastructure planning.

The study found that seasonal climate change represents anywhere from 1oC-1.5 oC impact on the winter or summer load forecasts for electric and gas utilities. The increasing temperatures will have variable impacts on electric and natural gas infrastructure for San Diego County. The changes are likely to have a more gradual long-term impact affecting the infrastructure investment level and asset base in San Diego County as well as in the average yearly-monthly-daily operations of the energy assets. The historical analysis found significant near term annual behavioral impacts on electricity consumption due to price, behavior and weather. The regression models that were constructed controlled for price, customer education and other factors. Climate-induced temperature change was found to lower winter gas heating requirements and increase summer electric load requirements - more so for the residential market than commercial market. The impact of temperature increases took into account pricing, market growth, efficiency and other market responses. Weather demand impacts range form just a few MW for the commercial market to over 300 MW variations for the residential market. Additional impacts on both average annual seasonal demand for natural gas for the residential and commercial markets as well as for the maximum peak sendout for natural gas. The regression models developed were statistically significant.

A final major finding of the project was the incidence of extreme weather conditions in Southern California are expected to increase which will make peak day planning extremely important for both reliability and cost savings.

## USING SOUND SCIENCE TO REACH A COMMON SENSE SOLUTION

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In 1999, the City of Kamloops initiated a Liquid Waste Management Plan (LWMP), to establish direction for the safe and environmentally-sustainable handling of sewage. This process is completed through the Government of British Columbia, and aims to ensure that input is received from all stakeholders, including Federal and Provincial Government agencies and the public. The completion of a LWMP is a site-specific alternative to compliance with the British Columbia Municipal Sewage Regulation. To comply with this regulation, the City of Kamloops would have had to construct a biological nutrient removal facility, at a cost of $67.3 million.

As part of the City's LWMP, an environmental impact assessment was completed to determine whether a high standard of treatment was justifiable scientifically, or whether there were alternative options. This was challenging, due to the need to address the concerns of the multiple stakeholders on technical, non-technical and political levels. The City of Kamloops discharges effluent to the Thompson River, which has a high profile both politically and socially, due to events which occurred in the early 1970's. During this time, discolouration of the Thompson River, foaming, fish tainting and excessive algal growth were observed. This resulted in extensive studies being completed on the River to identify the causes of these problems and to enhance the understanding of the anthropogenic factors which can affect the health of the River.

The City's environmental impact assessment was completed in several phases. The terms of reference and outcomes of each phase were discussed and reviewed with the stakeholders. The final stages, a phosphorus mass balance and predictions of algal growth responses, demonstrated that there was no scientific justification for the implementation of a biological nutrient removal facility, and that an alterative phosphorus discharge, resulting in a capital expenditure of $25.5 million, is environmentally acceptable and sustainable.

The presentation will outline how a challenging and difficult process, involving multiple stakeholders, resulted in success through using sound science to develop a common sense solution.

Key words: *sewage effluent, sensitive receiving environment, multi-stakeholder interaction, common sense solution*

## MINING AND EMS

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The mining industry has performed environmental impact assessments (EIA) of proposed projects for several decades. In most countries, the process of gaining approval for development is well laid out in non-voluntary, regulatory procedures. Permitting processes generally do not require development and certification of an internationally accredited Environmental Management System (EMS) such as ISO 14001. However, more frequently, mining companies see benefits in EMS, not only for their reputation and shareholder confidence but also, for benefits that EMS brings to local mines and communities. Usually, mining companies develop and certify EMS at operating mines. Rarely does a mining company seek EMS certification at an early stage of permitting approval. Such was the situation with De Beers Canada Mining Inc., which with the assistance of Golder Associates, certified an EMS for their Snap Lake, NWT diamond mine at the Advanced Exploration Stage. The EMS

was designed to grow with the mine as it advances through permitting, construction and operation phases. The EIA included commitment to a certified, third-party audited EMS throughout the life of the mine. Snap Lake has also integrated Sustainable Development principles and Occupational Health and Safety (OHSAS 18001) systems within its EMS. Dr. John Foster, Principal of Golder Associates, will use Snap Lake as an example of an integrated EIA/EMS approach to mine development.

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# Key Word Index

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