



Diverse solutions for contributing to sustainability



Sustainability is recognized as a global concept with broad potential for local implementation. As a global company, Golder Associates' intention is to contribute to sustainability along two parallel tracks: internally through the way we conduct our business and externally through our consulting services. Inside this issue of Technically Speaking we share with you some projects we have conducted for clients in different market sectors and geographic regions.

We strive to contribute to sustainability by considering the various demands for innovative development triggered by differences in context – geographic, economic, cultural, political and so on. In addition, we strive to structure our projects so they contribute to our clients' sustainable development goals. As you will see in this issue, innovative management of waste in Mexico not only deals with the base problem, but adds value by creating an alternative energy supply. One challenge to sustainability that we are pursuing with our clients is to manage data such that it is easier to track compliance. An innovative approach for this is presented in the article from Alberta, where there is a robust economy with considerable development.

Engineers and scientists can evaluate how a project can contribute to sustainable development through a matrix of client goals, project goals, and economic, geographic, political, cultural, and other relevant factors. As an anthropologist, respect for and preservation of culture are my work and passion, and an important consideration in dealing with sustainability. Inside you will read about some of my colleagues and their efforts. We are particularly proud of Dr. John Boyd's work with the International Federation of Consulting Engineers to produce guidance for building sustainable projects. We are also pleased to announce our acquisition with BRIDGES to Sustainability™, which you can read about inside.



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Mine's water supply preserves local economy in Iran



A NEW ZINC MINE IN THE IRANIAN DESERT WILL HELP ADD ECONOMIC DIVERSITY TO THE NATION'S OIL-DEPENDENT ECONOMY, WHILE THE MINE'S WATER-SUPPLY NEEDS CAN BE MET WITHOUT DAMAGING THE LOCAL AREA.

The Mehdiabad mine, in Yazd Province of central Iran, is being planned to tap one of the largest undeveloped zinc resources in the world. One significant challenge is the mine's need for water, some 300 liters of water per second, over the next 40 years. This is a major concern in an area that gets a scant 80 millimeters of rainfall each year.

The mine's owners wanted to know how they could access the water resources they need without disrupting the fragile economy of the region, which includes pistachio-nut farming.

Commissioned to study the mine's environmental impact and its expected effects on the local water supply, Golder first investigated surface water resources and found them virtually non-existent in this arid climate. The next step was to consider the groundwater resources, in the

form of aquifers. These resources, however, are already being depleted by local residents and farmers, and any mine use would quickly push these people into severe hardship.

The solutions Golder recommended included the use of some potable water that is being piped to the nearby city of Yazd and the re-use of treated wastewater from the city.

This balanced approach will help our client meet the environmental guidelines established in the international Equator Principles, which are intended to help facilitate the financing of projects in the region that contribute to a sustainable future.

Sustainability principles applied to an environmentally sensitive project – the Strait of Messina Bridge

THE STRAIT OF MESSINA BRIDGE PROJECT INVOLVES THE CONSTRUCTION OF A ROAD AND RAILWAY CROSSING JOINING CALABRIA, ITALY TO THE ISLAND OF SICILY. THE BRIDGE IS 3,300 METRES LONG AND WILL BE THE LONGEST SINGLE-SPAN SUSPENSION BRIDGE EVER BUILT. THE 60-METRE WIDTH WILL ACCOMMODATE SIX TRAFFIC LANES AND TWO RAILWAY TRACKS. IT IS A MASSIVE PROJECT BY ANY MEASURE.

The work plan of the proposing company, Stretto di Messina SpA, was approved by the Italian Government in 2003 and a tender has been called to identify the General Contractor. During 2005, a definitive work plan will be outlined and approval procedures initiated.

The project is located in a very sensitive area with complex ecosystems. Golder has been asked to draft the Environmental Technical Specifications to define the environmental mitigation works for the final design and construction design for the execution phase of the project. The set of specifications has been developed according to relevant national and European legislation, as well as state-of-the-art technical standards and will be a core part of the tender documentation.



Golder has also been asked to draft the Technical Specifications for the Environmental Monitoring Plan, which will address all environmental aspects, including territorial and social components.

The Monitoring Plan is a key tool to verify the environmental performance of the project over its whole life cycle.

The final project will involve substantial reclamation of the area and will be developed to achieve the best environmental compatibility, based on the existing plan and emerging sustainability practices.



Innovative project converts waste to energy in Mexico

THE FAST-GROWING CITY OF MATAMOROS IS ON MEXICO'S BORDER WITH THE UNITED STATES. NOW HOME TO 600,000 PEOPLE, THE CITY IS DEVELOPING A SUSTAINABLE SOLUTION TO SOME OF ITS PRESSING WASTE-DISPOSAL PROBLEMS.

On a daily basis, about 550 tonnes of solid waste are collected and disposed of in the municipal dump site that has no environmental controls and few separation practices in place for recyclable materials, household hazardous wastes or organics. In addition, the city must also dispose of approximately three million scrap tires that are scattered in the city and throughout the surrounding area. These tires are a breeding ground for mosquitoes and other disease carriers.

To deal with the tire problem and also to provide a local source of energy, Golder has been working on plans for an innovative energy project. Firstly, methane produced by the 10-year-old solid waste landfill will be tapped to fuel the pyrolytic gasification of the waste tires. A proprietary gasification process and the use of methane as a fuel supplement to dispose of waste tires are innovative technical developments that have never been done before. The proposed pyrolysis plant would process 75 tonnes of waste tires per day, produce low emissions, generate 5 to 6 MW of electricity and significantly reduce greenhouse gases.

Secondly, a 10 MW windfarm will be developed around the landfill to provide another renewable source of energy to further reduce the need for fossil-fuel generation. The two power plants will share a common infrastructure and generate revenue for the city.

This project will help divert waste tires from illegal dumps and provide a sustainable source of energy. It will also help train local personnel in these innovative technologies and provide revenues to support more modern waste management practices, thus building a sustainable way of managing waste in a fast-growing region of Mexico.

Helping meet demand for triple bottom line performance measures

ORGANIZATIONS ALL OVER THE WORLD ARE CHANGING THEIR VIEW OF SUSTAINABILITY AS A "NICE-TO-HAVE" TO A "MUST-HAVE," AND FROM "WHAT?" TO "HOW?" NOW WE CAN OFFER OUR CLIENTS ANOTHER RESOURCE FOR HELPING THEM MOVE THEIR BUSINESS TOWARDS A MORE SUSTAINABLE FUTURE.

Houston, Texas-based BRIDGES to Sustainability™, formerly a nonprofit think-tank, has merged its consulting services into Golder Associates. Initially focusing on providing a greater sustainability element to Golder's American clients and continuing with its existing projects, it will later expand to provide services globally.

BRIDGES helps clients integrate sustainability considerations into business practices. To do this, BRIDGES can tailor its clients' management systems to incorporate sustainability dimensions, assess sustainability risks and opportunities, develop sustainability performance indicators, and provide training and sustainability awareness programs.

This way, BRIDGES helps organizations meet changing societal expectations, helping them to succeed in what is becoming a new level of competition – for recruiting employees, for meeting government requirements and increasingly, in competition for financial resources.

By creating tools that organizations use to meet the triple bottom line of economic, environmental and social performance, BRIDGES helps them become more sustainable through long-term higher performance. The BRIDGES team has focused on measuring sustainability performance in pragmatic business terms so that companies not only improve their sustainability practices, but also demonstrate bottom and top line progress.



Database helps Canada's oil sector manage its impacts

THE OIL AND GAS SECTOR IN THE CANADIAN PROVINCE OF ALBERTA MAY BE ABLE TO MORE EASILY MANAGE ITS ENVIRONMENTAL AND SOCIAL IMPACTS WHEN A NEW COMPUTER-BASED INFORMATION SYSTEM IS ROLLED OUT.

The residents of petroleum-rich Alberta have long had mixed feelings about the oil patch. They like the tax revenue and employment it provides, but they are also concerned about its potential negative effects on their air, water, wildlife and social systems. To help our clients address these multiple impacts, Golder is working on a computerized flowchart and data management system that can help oil and gas companies keep track of the steps that they take to comply with the government's rules and regulations.

The system is to help track which environmental impact assessments and other documents have been filed, which permits have been applied for and received, when renewals of permits must be done, and track the wide array of compliance issues. Even small oil and gas companies may operate or have a part ownership in dozens of wells, pipelines and other infrastructure elements, and the database can help them avoid unintentional non-compliance.

A map-based interface will allow users to click on specific wells, pipelines or other areas of interest to find their status, deadlines for next steps and other information.

The result is much more than compliance – it helps the energy sector contribute to a more sustainable future, economically and socially, for the human and animal inhabitants of the province.



Creating a future for African mining towns

IN MANY PARTS OF THE WORLD, COMMUNITIES THAT GROW UP BESIDE MINES LIVE A PRECARIOUS LIFE, WITH THEIR FUTURES LARGELY DEPENDENT UPON THE SUCCESS OF A MINE THAT WILL EVENTUALLY EXHAUST ITS ORE BODY. RECENT EXPERIENCE SHOWS THAT IT IS POSSIBLE TO TAKE A STRUCTURED APPROACH THAT WILL HELP BUILD A SUSTAINABLE FUTURE AFTER THE MINE CLOSES, WITHOUT TURNING THE MINING COMPANY INTO A SURROGATE GOVERNMENT.

Mining companies in Africa have learned that because cash-strapped governments find it difficult to provide services such as hospitals, schools and water, they are often called upon to act as providers to towns near their mines. While willing to help, the companies may not have a good understanding of what investments will produce the best outcomes and which will be sustainable after the mine closes.

Accordingly, Golder has developed ways to determine the priorities of local communities and suggest ways to meet those needs. The process starts with research, including structured interviews with local people to determine the baseline situation and to consider future requirements

that could range from bare survival issues to higher-order needs such as personal fulfillment. Three types of opportunities – biophysical, social and economic, within the three dimensions of sustainable development – are considered.

We have found that stakeholder input can help identify opportunities to help companies contribute to sustainable development. The opportunities are categorized into quality of life values, and then ranked using a simple scale akin to that used for environmental impact assessments.

As a result, the mine owners and the neighboring communities have a better understanding of what they can do throughout the life of a project to help build a balanced future.



Empowering black entrepreneurs in South Africa

A NEW CONSULTING FIRM IN SOUTH AFRICA, ZITHOLELE CONSULTING (PTY) LTD., IS HELPING BUILD A MORE SUSTAINABLE ECONOMY BY SUPPORTING GREATER PARTICIPATION IN BUSINESS BY THE COUNTRY'S BLACK POPULATION.



Although almost 80 percent of the country's 44 million people are black, this group has long been disadvantaged and played only a marginal role in the country's economy. Through its Black Economic Empowerment (BEE) initiative, the federal government aims to redress this imbalance. Public-sector institutions and many companies now give preference to black-owned companies in their procurement practices.

In 2003, to support BEE aims, Golder Associates Africa (Pty) Ltd. assisted in setting up Zitholele Consulting, with a majority black shareholding. Zitholele operates independently of Golder, but,

when necessary, it draws on Golder for technical expertise, resources, management systems and administrative support. Zitholele Consulting is an empowerment company that provides specialist consulting services to the public sector in public participation, social development, environmental services, engineering (environmental, water, structural), agri-business and project management.

Since its formation in mid-2003, the company has steadily expanded its services to the public sector. Zitholele provides environmental assessment, waste management, policy and strategy

consultation and local government capacity building for projects ranging from water and sanitation services supply to municipal infrastructure. The company has grown to a staff of 11 black professionals and technical specialists.

Zitholele Consulting is an encouraging example of a successful small business enterprise that is black owned and managed. And through the work the company does on public sector improvement projects, the firm is helping to build an economic system that is self-sustaining.

For more information about the projects featured in this newsletter please contact us at: solutions@golder.com. Electronic versions of the newsletter are available at: www.golder.com. Just follow the links to our "Library" and "Newsletters".

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Engineering profession pushes towards a sustainable future

AROUND THE WORLD, THE ENGINEERING PROFESSION IS TAKING UP THE CAUSE OF SUSTAINABILITY. WE ARE FINDING WAYS TO APPLY THE BASIC PRINCIPLES TO THE WAY WE WORK, IN ORDER TO SUPPORT A MORE BALANCED FUTURE.

Generally thought of as practical, let's-get-it-done professionals, some engineering firms are now taking the larger ideals of sustainability and applying them in their project work.

Central to this is the International Federation of Consulting Engineers (FIDIC), whose Executive Committee includes a long-time Golder employee – John Boyd. FIDIC is working on ways to apply sustainability principles to engineering.

For example, a major goal of sustainability practices is to help alleviate poverty on a global scale. Engineers and scientists can apply this when working on projects in less-developed regions if they make a point of recruiting a workforce of local people and sourcing materials from local suppliers.

As an organization, Golder is applying sustainability principles

within the company by finding ways to align our work with those principles. Greater impact, however, will come through recommendations to our clients that fit sustainability ideals, such as carrying out construction projects in an environmentally positive way.

Golder is contributing by developing training materials on sustainability, offering learning through our internal staff-development programs, writing articles in targeted trade media and through workshops for the profession as a whole.

At another level, FIDIC is helping lead the way for the engineering profession to move forward and become more in tune with the world's needs and society's expectations.

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Technically Speaking is published for valued clients and employees of Golder Associates. This quarterly newsletter includes articles showcasing innovative and technically challenging projects that Golder professionals have worked on throughout the world. We value your opinions. Please contact Gregory A. Beckstrom, Managing Editor, at + 1 651 697 9737 or greg_beckstrom@golder.com if you have any questions or comments.

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