

Agents of global change

Engineers are at the heart of the action on sustainable development. They have the competencies; now they need to make the commitment, says George Roter, co-CEO of Engineers Without Borders.

by George Roter

An idling SUV, an overflowing landfill site, a poor child in Africa—what do they all have in common? They are targets for sustainable development. We have all heard the term, “sustainable development,” but how many of us know what it means?

Sustainable development is about solutions for today with an eye on the future—meeting the needs of society without compromising the ability of future generations to meet their needs. It is about a commitment to sound policies and management that makes economic growth and environmental protection

mutually supportive. It is about recognizing and addressing global disparities in human development. Most importantly, it is about taking action.

Engineers actions have a fundamental impact on whether sustainable development is yet another term that floats away on the wings of its rhetoric or whether it becomes anchored in the foundations of our society. The challenges of sustainable development require engineers, as citizens, to better understand the impact and implications of their lifestyles. They require engineers to help make those lifestyle choices as sustainable as possible.

Commission authored a report called *Our Common Future*, which laid the foundation for the much publicized 1992 Rio Earth Summit.

The Rio Summit took the issue of sustainability out of the conference rooms and into our living rooms. People around the world were affected by the growing hole in the ozone layer and by the incipient rumblings of global warming. The conference reflected this growing awareness and produced a series of actions; these were titled *Agenda 21*, laying the ground work for sustainable development—a balance of economic growth, international trade, equitable human development and a healthy, productive environment.

Since then, other well known gatherings, negotiations, agreements and declarations have come to pass: The Kyoto Protocol in 1997; the Millennium Development Goals in 2000; and the 2002 World Summit on Sustainable Development (WSSD) in Johannesburg, South Africa (labelled by some as Rio +10).

Ideas at work

Taking stock in 2003 we can ask: What has come of 30 years of meetings? How are the ideas translated into reality? I'd say with a lot of engineers.

As a profession, engineers had to fight their way into the international negotiations. As preparations were being made

Growing momentum

If there was a birth to the idea of sustainable development, it came in 1972 when the international community convened for the Stockholm Conference on the Human Environment. Its task was to grapple with and take action on the issues of human development and environmental sustainability.

The decades that followed were a whirlwind of activity: the United Nations Environment Programme was formed; the Brundtland



"The chief of Bapa, David Simeu, looks on as EWB volunteer Ian Randall pours the first cup of water from a new well in Bapa, Cameroon."

for the Rio Earth Summit in 1992, engineering was not on the agenda and engineers were not seated at the table. As had been repeated many times before in history, the policy makers viewed technical planning and implementation as “details” to be discussed later and certainly not fundamental to the discussions that were taking place. However, and perhaps for the first time in history, the engineering profession took action. Through the efforts of the International Federation of Consulting Engineers (FIDIC) and the World Federation of Engineering Organizations (WFEO), engineering and technology were featured prominently throughout *Agenda 21*, and a new World Engineering Partnership for Sustainable Development (WEPSD) was created to outline a framework for taking action on sustainable development.

Further collaboration, both within the engineering community and among engineers and scientists, provided greater clarity on the role of engineers and technology in achieving sustainable development targets. The World Federation produced *The Engineers Response to Sustainable Development* for the Rio +5 conference in 1997 and *The Role and Contributions of the Scientific and Technological Community to Sustainable Development* outlined concrete actions at the WSSD in 2002.

Call to action

The reality is that increased sustainability will come from two sources—changes in individual lifestyles and changes in technologies and processes. Engineers drive the latter.

For example, China’s effort to switch to cleaner energy sources and improve energy efficiency resulted in greenhouse gas reductions of 17 per cent from 1996 to 2000, while their GDP grew by 36 per cent—a monumental accomplishment. But more needs to be done. The new focus on hydro-electricity means that water scarcity in China’s largest cities has become dire, with two-thirds of them experiencing regular water shortages throughout each year.

Closer to home, the record is also mixed. On the one hand, large energy corporations have made decisions to preserve biodiversity, such as Petro-Canada’s decision to forfeit undersea mineral rights to

create the Gwaii Haanas National Marine Reserve off the coast of B.C.’s Queen Charlotte Islands. But greenhouse gas emissions in the energy sector rose 26 per cent from 1990 to 1999.

Finally, NGOs such as ours, Engineers Without Borders, are working in places like Western Cameroon to help train local communities in planning and implementing hygiene education, water and

sanitation projects. But over 2 billion people worldwide still lack access to adequate sanitation and over 1 billion people live without clean, safe water.

Engineers are at the heart of action. But much more needs to be done. The scale of today’s efforts must increase by orders of magnitude if the world is to achieve the objectives of *Agenda 21*.

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It’s up to you Take five steps forward

There are five areas in which individual engineers must take action:

1. Get informed

This begins with rethinking engineering education in Canada. Engineers must commit themselves to developing communication skills to facilitate interdisciplinary cooperation. Engineers must be trained in complex problem identification and solving, and increase the breadth of educational programs to include global education programs on sustainable development, for example. Not only must these changes be incorporated into engineering curricula, but also programs must be established for the professional development of practising engineers.

2. Get engaged

Engineers in Canada must continue their participation at the policy level, both nationally and internationally. In Canada, this means broad participation in efforts such as the Canadian Council for Professional Engineers’ Climate Change Action Plan, which was launched in February 2003. Internationally, this means joining and participating in organizations such as the WFEO (Canada is no longer a member of the WFEO as of 1997).

3. Spread the word

Engineers must develop our collective voice and spread their understanding, to the broader Canadian public, of the critical issues surrounding sustainable development. The force of 65,000 engineers in Ontario is significant. Individual engineers and engineering students are engaging the Canadian public through organizations such as Engineers Without Borders.

4. Commit to environmentally-friendly practice

The PEO Code of Ethics establishes a framework for thinking about the long-term consequences of today’s actions by placing “public welfare as paramount.” This directive is reflected in safety and financial considerations for designs and processes. The Code of Ethics must go further in both form and practice—it must also hold paramount the protection of both the natural and the built environment in accordance with the principles of sustainable development.

Engineers must lead in developing and utilizing new technologies and new engineering processes to achieve sustainable development. We must shift our thinking to apply the precautionary principle—to act to protect the environment even if evidence of potential damage is not conclusive—to all our work. We must apply an environmental factor of safety to all our work.

5. Become leaders and decision makers

Engineers already hold leadership and decision-making positions within corporations and governments and now need to apply that power to making change for sustainable development. Action at this level can make huge strides. For example, efforts by the management team at DuPont Canada, by an engineer, has resulted in an environmental policy that has achieved impressive such results as an 88 per cent reduction in greenhouse gas emissions between 1994 and 2000.

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Engineering day-to-day

Produce differently. Consume differently. Think differently. These critical actions required for sustainable development demonstrate how integral engineering and technology are to the process.

On the production side, engineering is involved at all stages, from natural resource extraction to processing and modifying materials to resource recovery. On the consumption side, engineering is front-and-centre again, particularly in the way engineers transport their products and themselves in the

spaces where they work and live. In both cases, engineers have the opportunity to be leaders in developing and utilizing new technologies and processes to achieve sustainable development.

In fact, engineers—Canadian engineers in particular—are already leaders in sustainable development. Some of the most promising zero-emission fuel cell technology in the world comes from Ballard Power Systems, a Vancouver company that is both led by and comprised of engineers. Engineering researchers from the University of Waterloo are among the world leaders in closed-loop systems thinking, critical to understanding and

planning broad strategies for sustainable development.

Sustainable development is one of humanity's most pressing missions over the coming years. As with any mission, it requires competence and commitment to achieve.

Engineers certainly have the competence. Now they must develop the commitment to becoming agents of global change. ♦

George Roter is co-CEO of Engineers Without Borders, a non-governmental organization that supports development in developing communities. Its work is funded by donations. To learn more about the organization, visit www.ewb.ca.