

# Sustainability

**S** EARCH FOR THE meaning of “sustainability” and you’ll soon be led to this: “Sustainable development: development that meets the needs of the present without compromising the ability of future generations to meet their own needs.”

It comes from “Our Common Future,” the 1987 report of the World Commission on Environment and Development, a U.N. exploration of **conflicts between development and preservation of the environment.**

Growth is also essential, and thus the three goals of social progress (or development), environmental protection, and economic growth, pursued together, have become known as the pillars of sustainability.

They are important everywhere, in rich countries and poor. If the use of natural resources in developed countries already threatens our environment, how can advances in quality of life and prosperity be extended to all without making the environmental damage far worse?

**Sustainability must be approached by both the public and private sectors. Governments can contribute through laws, regulations, planning, and infrastructure development.** These actions primarily serve to accelerate progress in the private sector, where opportunities for improving sustainability are great. Businesses are large consumers of energy and natural resources. Their operations often affect our environment, sometimes dramatically, while at the same time there are many business opportunities in sustainable development.

Within the business community, interest seems to be growing. Customers, employees, and stockholders are pushing for more attention to sustainability, and the pillars are sometimes recast as “people, planet, and profit,” or the “triple bottom line” of social responsibility.

## INDUSTRY INVOLVEMENT

The U.N. Global Compact, which describes itself as “the world’s largest

corporate sustainability organization,” has 7000 business signatories from 135 countries. The World Business Council for Sustainable Development, an organization of CEOs of large corporations, has 200 members committed to “business solutions for a sustainable world.” In June, I was among 2500 participants in the U.N. Corporate Sustainability Forum, a prelude to the Rio+20 Conference on Sustainable Development, where more than 200 new commitments to sustainable solutions were announced. Regarding Rio+20, CNN reported: “Businesses played a much bigger role at this summit than they did 20 years ago, with many observers saying they have actually taken the lead by providing real examples of sustainable development.”

The position of chief sustainability officer (CSO) has been added to many executive rosters, including those of large corporations, such as 3M, DuPont, Ford, Procter & Gamble, Siemens, and Toyota. Scott Wicker, an electrical engineer and the first CSO of the delivery service company UPS, argues that corporate sustainability strategies require the expertise, mentality, and instincts of engineers. He says these strategies should be approached like an engineering project, with a particular emphasis on data-driven design. One of Wicker’s first contributions was to develop computer algorithms to dynamically plan delivery routes, saving substantial time and fuel.

## ENGINEER INVOLVEMENT

Most engineers will steer a conversation about sustainability toward energy. It’s a big target. By one estimate, 87 percent of the world’s primary energy consumption is derived from fossil fuels, principally oil, coal, and natural gas.

And within the energy sector, engineers will focus first on oppor-

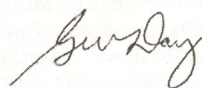
**tunities to improve the efficiency with which energy is converted** (such as electricity generation), transported, and used. According to the U.S. National Academy of Engineering, accelerating the deployment of established energy-efficiency technologies could more than offset the growth of energy demand in the United States, a conclusion that probably applies to other developed countries as well. Further, the payback time for investments in efficiency can be relatively short, leading to substantial long-term savings.

**Second, engineers will focus on changing the mix of energy sources,** recognizing that the optimum may differ widely by country or region. Greater use of natural gas, wind, and solar technologies to generate electricity has reduced U.S. carbon emissions to a 20-year low. Denmark has set a path toward a 35 percent renewable component in its energy supply by 2020 and 100 percent by 2050.

It will also be engineers who answer many of the key questions about energy technology. Is

a breakthrough in mass energy storage essential for renewable energy to supply a large fraction of our energy needs? Can carbon-capture and -storage technology be made to work, at scale and with a cost low enough so that coal can remain an important energy source? If the component of fossil fuels in the energy supply is to diminish, is nuclear generation the only way to meet base-load electricity demand?

I’m optimistic. Engineers created the technologies that dramatically advanced quality of life in developed countries. And though our community sometimes failed to adequately consider the environmental consequences of those technologies, ours is also the profession that can mitigate those consequences while extending the benefits of technology to the rest of the world.



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