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Sustainability Careers for Chemical Engineers

The Brundtland Commission (formerly known as the World Commission on Environment and Development) coined the term *sustainable development* in a 1987 report, defining it as "development which meets the needs of current generations without compromising the ability of future generations to meet their own needs." Considering the needs of the future as well as the present is now a topic of discussion throughout business, politics, and academia. Chemical engineers can and do lend their expertise to aid sustainability efforts in each of these realms.

A career as a sustainability professional, however, is still quite a new idea, and the path to getting there is somewhat uncharted. If you want to pursue a career in sustainability, you will need to determine the career track you want and employers that offer such positions; the skills and attributes you need to succeed in those positions; and the steps you need to take to gain the necessary knowledge.

Opportunities for chemical engineers interested in sustainability are offered in almost all sectors, including government, nongovernmental organizations (NGOs), academia, industry, nonprofits, and startups. Within these realms, you might consider sustainability when working on individual projects or as part of your organization's overall strategy.

Chemical engineers are particularly well-suited to technical sustainability positions. You can further the cause of sustainability as a continuous improvement, research and development, design, or process engineer. Engineers who hold these positions might work to minimize resource use and waste generation for their product or process by developing alternatives to nonrenewable feedstocks or by making products biodegradable. Improving resource use efficiency, such as energy or water, is also an area where chemical engineers can contribute.

Environmental goals must be achieved while also ensuring the safety of people and the process, as well as generating a profit. It is up to operation and production managers to ensure technical teams apply robust engineering principles and innovative thinking to develop solutions that consider all of these goals, while quantifying success using sustainability performance metrics (*e.g.,* water consumption, solid waste creation, etc.). Leadership must also take responsibility for the corporate sustainability strategy, focusing all parts of the organization around sustainability goals.

The corporate world is not the only area chemical engineers can play a role in sustainability. Professors, researchers, and other academics can incorporate sustainability concepts in both learning and research objectives. Government organizations, such as the National Science Foundation (NSF) and the U.S. Environmental Protection Agency (EPA), also offer roles for engineers interested in sustainability. As a government employee, you could provide input for policy development or for funding of research to advance sustainable development.

Your engineering background will benefit sustainability efforts. Engineering programs accredited by the Accreditation Board of Engineering and Technology (ABET) are required to teach graduates to analyze and interpret data, solve problems, work in multidisciplinary teams, and communicate effectively. These are essential skills, whether you hold a more traditional engineering position or are involved specifically in the field of sustainability. Leaders who understand engineering principles are better able to evaluate the feasibility of corporate sustainability goals.

ABET-accredited engineering programs must prepare undergraduates to design a system, component, or process that meets a variety of needs, and one of those needs is sustainability. Although sustainability courses and topics are becoming more prevalent at universities, more can be done to integrate sustainability into the core curriculum.

If you feel that your undergraduate program fell short of preparing you for a career in sustainability, you can pursue one of many continuous education options. Advanced degrees in sustainable engineering, systems, and development are becoming more prevalent. A nontechnical degree in sustainable policy, law, or business administration may benefit those interested in exploring areas beyond engineering and design.

If you do not have the time or resources for a university program, look into ways to earn professional development hours (PDHs) to learn new skills or identify a new direction for your career. You can earn PDHs by attending conferences, such as those organized by AIChE and the Institute for Sustainability (IfS), or by taking online or classroom courses. If you want your individual learning to count as PDHs, ensure that the course is qualified to provide them. AIChE offers a Credential for Sustainability Professionals (ACSP) that involves education, training, and examination to prepare and designate qualified sustainability professionals.

Whether or not we are involved formally in sustainability efforts, as engineers and citizens of the world, we have a responsibility to use our skills to improve society. Incorporating sustainability principles into our work will help us to optimize our mark on the Earth. CEP