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Help Wanted: Power Engineers

Working to increase the dwindling supply of power professionals

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The United Kingdom, Canada, and other countries will soon experience a shortage of power engineers, with the shortage in the United States expected to be the most acute. During the next five years, about 45 percent of U.S. engineers working for electric utilities will be eligible for retirement, according to recent studies. And with countries making huge investments in building smart grids, the power industry is facing a major challenge. A lack of skilled power engineers could jeopardize the grids.

The [IEEE Power & Energy Society](#) (PES) says the key to strengthening the workforce is to improve power engineering education. To this end, the society has been working on an initiative called the [Power and Energy Engineering Workforce Collaborative](#) (PWC).

As part of the effort, PES in June established the US \$1 million IEEE Power & Energy Society Scholarship Fund. Administered by the IEEE Foundation, the fund is aimed at enticing high school and undergraduate students to study power engineering.

The society has been working on the workforce shortage since 2007, when it launched the PWC. The collaborative is composed of PES members, university administrators, industry executives, and government officials.

During the past two years, the PWC has been busy. Last year it published a report, [Preparing the U.S. Foundation for Future Electric Energy Systems: A Strong Power and Energy Engineering Workforce](#), that outlined the challenges facing the industry as well as potential solutions. PES and IEEE-USA have been working together to outline how \$100 million in funds from the American Recovery and Reinvestment Act—the economic stimulus plan enacted last year—could be spent on training workers needed for the smart grid. IEEE-USA last year sent its recommendations to members of Congress.

In addition, the PWC has developed a career service Web site, <http://www.pes-careers.org>, where students can get advice on pursuing careers in power engineering. The IEEE PES has also held student job fairs at several of its meetings in North America.

"Engineering the Future," an article published in the July/August issue of *IEEE Power & Energy Magazine*, highlighted the PWC's objectives and progress. Although the initiative is focused on the United States, "similar efforts should be effective for other countries," the article stated.

Establishment of the PWC came about partially in response to a 2003 survey of 40 U.S. and 27 non-U.S. academic institutions. The study showed U.S. universities were struggling to replace retiring power engineering faculty, and it predicted that a lack of power engineering professors will lead to fewer programs and hence fewer students pursuing degrees in the field, making the shortage even worse.

The study also found that universities in the United States on average replace four power engineering faculty retirees with three faculty members, while there are five replacements for every four such retirees at non-U.S. universities.

"We've seen an increase in interest from students in renewable energy and the smart grid," says IEEE Senior Member Wanda Reder, who established the PWC. "But we need an ample number of professors to accommodate that demand. Many professors I've talked to said their class sizes have been increasing."

Retiring Engineers

About 7000 of the power engineers in the United States—roughly half of them—are expected to retire from the profession or leave for another reason in the next five years. They will be taking with them their knowledge of how to maintain the current electric power system, with which the new smart grid will be integrated. Their replacements will have to get up to speed on all aspects of the current system while adding expertise in communications, information technology, and other fields.

What To Do

The PWC has outlined several recommendations for tackling the problem. One is to double the number of undergraduate and graduate students in power engineering—which is easier said than done. The PWC estimates that about 900 undergraduate students are graduating each year who have an interest in power engineering jobs. There also seems to be an increase in students choosing the major, according to recent reports.

To attract more students to the field, the group recommends providing \$4 million in funding for 2000 undergraduate power engineering scholarships. In addition, it suggests the creation of 2000 internships and other job opportunities for electrical engineering students. That would give them a chance to see what the power industry is all about, the group says.

To handle the anticipated increase in students, the PWC recommends that schools hire 80 power engineering faculty members during the next five years. To fund those positions, university power engineering research support should be raised from \$50 million to \$100 million annually during the next five to eight years, the group says.

"While it is difficult to know exactly what future power engineering workforce needs will be, doubling student graduations over the next five to eight years is the right direction to head in," the PWC says.

Success In Latin America

While the IEEE PWC is working on ways to increase the number of students studying power engineering, Latin American universities are seeing record enrollments in the field. For example, Brazil, with a population of 192 million, graduates approximately 1000 power engineering students each year, compared with about 900 in the United States, whose population is more than 300 million.

Many Latin American countries have undertaken economic development projects, including improving their transportation and energy infrastructure. Engineers are required to oversee the projects—which gives them prominent roles in society. Therefore, the field is attractive to students. Engineers earn top salaries in relation to other professions, according to "Where School Is Cool," an article that ran in the July/August issue of *IEEE Power & Energy Magazine*.

Although in the United States many outreach programs aim to show the public how important engineers are, in Latin America the public already respects them. Engineers there are highly regarded, and students have many role models in the field. In Chile, for example, several presidents have been engineers.

"Societal perceptions and the opportunities engineers actually find in the labor market make engineering very attractive," the article says.

INVESTI NEL TUO FUTURO
ISCRIVITI AL CORSO DI LAUREA IN INGEGNERIA ELETTRICA



Image: James Provost