

ENERGYWIRE

EDUCATION: Energy capital's colleges tailor new programs to oil and gas industry *(Wednesday, February 6, 2013)*

Nathanial Gronewold, E&E reporter

HOUSTON -- The floor-to-ceiling monitor at a Rice University laboratory here allows computer talent to test how their models and complex formulas may work in real life, in vivid graphic displays made three-dimensional with the aid of special glasses viewers wear.

This equipment can be used by staff and students at Rice for a variety of disciplines and different types of research that require high-powered computing. But Jan Odegard, executive director of the school's Ken Kennedy Institute for Information Technology, says he uses it to try to get current and prospective computer science majors interested in careers with the oil and gas industry.

"The hardest challenge for this industry is really Google, Apple, Microsoft, Facebook. That's the competition that we have, that's where the computer scientists and a lot of the computational scientists go because they're sexy companies to work for," Odegard said. "And yet I think the career potential and the kinds of problems they get to work with in the energy industry are equally as interesting ... and maybe even more challenging."

Completed last summer, the Visualization Laboratory was paid for with money from the National Science Foundation and Chevron Corp. And it's just one of the more recent visual representations of the transformation that's been going on at this city's colleges and universities, all in direct response to the boom in oil and gas activity.

This city's entire network of academic institutions is busy remaking itself to take advantage of the growing energy industry. And although Houston has long touted itself as the "energy capital of the world," most of the changes to

the academic landscape here have occurred only in the past two years.

Experts say that's largely because of the globalization of the industry and its increasing technological sophistication, plus its expansion into more remote and hostile parts of the planet. Because of this greater complexity, oil and gas companies are looking beyond their own internal education and training systems and seeking help from colleges and universities to keep up with the daily changes.

Academia here is responding.

"I think if you look at the programs that have been developed over the last couple of years, we really are developing best-in-class graduates who are going to be able to work very effectively in those kinds of environments," said Marshall Schott, associate vice president for outreach at the University of Houston.

Education-to-energy connection

The Houston Community College system is developing programs aimed at steering students into degree tracks that could lead to jobs with energy companies. The University of Houston has arguably undertaken the most changes, revitalizing its petroleum engineering degree program and building out an entire separate campus devoted to energy research and education.

Meanwhile, Rice is busy carving out its own niche as the nation's hub of thought on energy economics, management, policy and politics. The leadership at Rice is also determined to take a broader interdisciplinary approach toward energy education, teaching and researching fossil fuel development and its links to emerging science and technology but also exploring its ties to economics and the social sciences.

"What we find is that any course we offer in the energy arena gets an enormous number of students wanting to sign up," said Daniel Cohan, assistant professor at Rice's Department of Civil and Environmental Engineering. "We don't have a department ... in energy studies, because energy is something that cuts across so many disciplines."

Cohan's research centers on developing photochemical models and their application to air quality management. In addition to the technical aspects, he and his students consider policymaking and public health as part and parcel of their investigations. It's an attitude that Rice as a whole is trying to embrace, he and others at the university explained.

"I developed a course from scratch on energy and the environment, and it's taught in our civil and environmental engineering department but is cross-listed with earth science as well, so it also gets students from across engineering and the sciences," Cohan said. "My course gets oversubscribed every spring with a long waiting list."

The University of Houston's push to become a major center of oil and gas industry education and research is physically transforming that school.

Just two years old, UH's Energy Research Park was born out of an old manufacturing and fabrication campus run by oil field services giant Schlumberger Ltd.

The university, with support from the likes of ConocoPhillips Co. and Devon Energy Corp., has remade the research park into the home of its petroleum engineering department. UH says it already has 400 undergraduates and 100 graduate students enrolled there. Well completion, well design and engineering, and well intervention are all taught at the campus, with a particular emphasis on offshore oil and gas development, where Schott said the industry communicated a strong need for new academic training.

Last year the University of Houston also launched its subsea equipment engineering program. It is the only such program in the United States, another response to the university's regular and increasingly frequent communication with oil and gas professionals.

"That was initially designed sort of as a certificate, a graduate-level certificate program in subsea ... and it was so popular that they built it out into a full master's degree," Schott explained. "In our conversations with industry, it was an express need, and so we're trying to respond to the express needs of business and industry to help provide

better training."

Students steer some growth

Academic leaders at Rice University said their recent push toward greater attention on energy also has been heavily influenced by the recent advances in the industry and demand from companies for more educational options outside their own training centers. The oil and gas sector's very public period of good fortune is also fueling interest from the student body there.

"The students themselves have become more and more interested in energy," said Ken Medlock, senior director of the Center for Energy Studies at Rice's Baker Institute, which is seeking to claim its place as the national think tank on energy issues.

Medlock lectures on the economics of energy. The number of students interested in taking his classes is greater than the number of seats available, he said.

"Back in 2004 when I was first teaching the course, we would average maybe 45 to 50 students," he said. "The last two falls we've averaged close to 100 students, so that really tells you what the students are seeing where the opportunities lie."

The Center for Energy Studies (CES) was launched last year, along with Rice's schoolwide Energy and Environment Initiative, because of the signals the faculty was receiving from the city's population of oil and gas professionals, Medlock said. CES recently hosted a closed-door discussion on emerging cybersecurity threats that energy companies are facing. The high-level discussions included representatives from the FBI and the State Department. Talks on other topics are being planned.

The University of Houston's response to the industry's growth is to emerge as a center for training the next generation of engineering and manufacturing muscle, with its own separate campus and facilities. With a student body of about 40,000 and its recent elevation to Tier One research institution status, that school has more resources at its disposal to take this approach than the smaller Rice, which hosts about 3,700 undergraduates and 2,300

graduate students.

Schott says he's working to make UH's mark felt within the existing oil and gas workforce. His university is working directly with Royal Dutch Shell PLC on a program that grants Shell employees credit for company training that can be put toward a master's degree.

Where to grow next

UH is also looking to make its presence known throughout the city as it moves to market its educational services to industry professionals who are midway through their careers.

That means going to where the companies and their employees are, or will be. To accomplish this, Schott said his university is courting industry workers to its satellite campus in the suburb of Katy, where many commuters to the Energy Corridor live. He's also partnering with the Houston Community College system to develop programs that let employees take coursework or receive training at HCC campus scattered throughout the city, augmented in part with distance learning online.

It's a forward-looking strategy. Schott acknowledged that his team is considering getting UH a presence in the Energy Corridor itself. Millions of square feet of new office space is already planned or under construction there as companies undertake big expansions of their operations (*EnergyWire*, Jan. 4).

He also wants to get UH coursework for continuing education in the north edge of the city or the Woodlands in time to welcome the launch of a massive new office complex Exxon Mobil Corp. is building there.

Meanwhile, Rice continues to roll out initiatives focused on energy. This spring, Medlock said, the Energy and Environment Initiative will issue its first request for proposals, soliciting from its faculty and students ideas for lines of research that the initiative will seek out grants and seed money for. He said Rice has also been approached by the Norwegian oil and gas giant Statoil SA on possible future collaborations.

"We continue to develop, and everything we're developing is meant to be flexible," Medlock said. "It really is about steering the ship to try and help build interdisciplinary programs on campus."

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