



# I N S I D E

# THE ENERGY CENTER

*The structure is massive, a tribute to dedication and perseverance in difficult times, but even more remarkable is its underlying concept. The Energy Center program is cutting across traditional disciplinary lines to focus the resources of the academic and industrial worlds on one of civilization's most critical issues.*

by BEN FENWICK  
photos by Gil Jain





**Energy Center Director Barnet Groten intends to take energy literacy campus-wide with energy-related course work in nearly every undergraduate field.**

*“The key to success in the world of energy is to learn how to attack problems that don’t fall conveniently under any particular discipline, as very few real-world problems do.”*

**T** rue innovation not only changes how something is done, but also how people think about doing it.

That kind of innovation is represented by the OU Energy Center, the new \$50 million structure now dominating the OU horizon. However imposing the structure may be, it is dwarfed by the concept that led to its construction.

The Energy Center will be a place where the different energy-concerned academic disciplines, as well as energy-related industry, can learn and conduct research side-by-side to find new answers for tomorrow’s energy-hungry world. The Energy Center goes beyond what most would consider to be an inter-disciplinary, or even non-disciplinary, approach to problem solving.

“In the past, the University—and even the energy world itself—was structured in the way that fit the last 50 years,” says Energy Center Director Barnet Groten. “We had disciplinary lines. You were a geologist, you went out to find energy. You were an engineer, you converted energy; you found out how to turn it into heat and work. An environmental scientist or

a biologist? You found out about the effects of energy on ecosystems and people.”

But the energy world today is a much more complicated place than it was 50 years ago. A decision to drill for oil still requires the services of the geologist and the engineer, but neither of them can drill without consulting the ecologist to determine what steps must be taken to protect the environment.

Of course, no one will drill for that oil without discussing the project with someone versed in economics to find out if the project will make money. And, inevitably, somewhere in the discussions will be lawyers and politicians. What is the answer to breaking down the barriers between the professions operating in the energy world?

“The Energy Center concept is jumping ahead a little bit,” Groten says. “The concept will require, if it is successful, that a lot of these classic lines—and barriers—between the disciplines begin to blur out.”

In the Energy Center, Groten explains, representatives of different disciplines will begin to learn each other’s language. They will teach classes together and conduct research together. The geologist will be down the hall from the petroleum engineer, who might be having coffee and discussing another problem with a chemical engineer, atmospheric scientist or computer graphics expert.

“We need more concerted activity on a problem without worrying about whether it fits into one discipline or another,” Groten contends. “The key to success in the world of energy is going to be to learn, as a country, how to attack problems that don’t fall conveniently under any particular discipline, as very few real-world problems do.”

First conceptualized in 1981, the last phase of the Energy Center building will be complete and ready for its occupants by fall 1990. The College of Geosciences, the School of Petroleum Engineering, the School of Chemical Engineering and Materials Science and the Oklahoma Geological Survey

all will share the space within the new structure.

The laboratory floors, most of which are underground, will be occupied by classrooms and teaching and research laboratories. Chemical engineering, geology, geophysics, petroleum engineering and geography will share space in the basement's wet and dry laboratories.

Billy Crynes, dean of the OU College of Engineering, says it is logical to have those engineering schools located with the other energy disciplines, because the OU engineering tradition is steeped in energy.

"We have as big a share as any college on the campus in respect to energy education and energy re-

search," Crynes says. "We've got a lot at stake here because of our tradition. Energy is what we've been doing for the life of the University and what we'll be doing for as long as we can see into the future. We expect to be a major player in Energy Center activities."

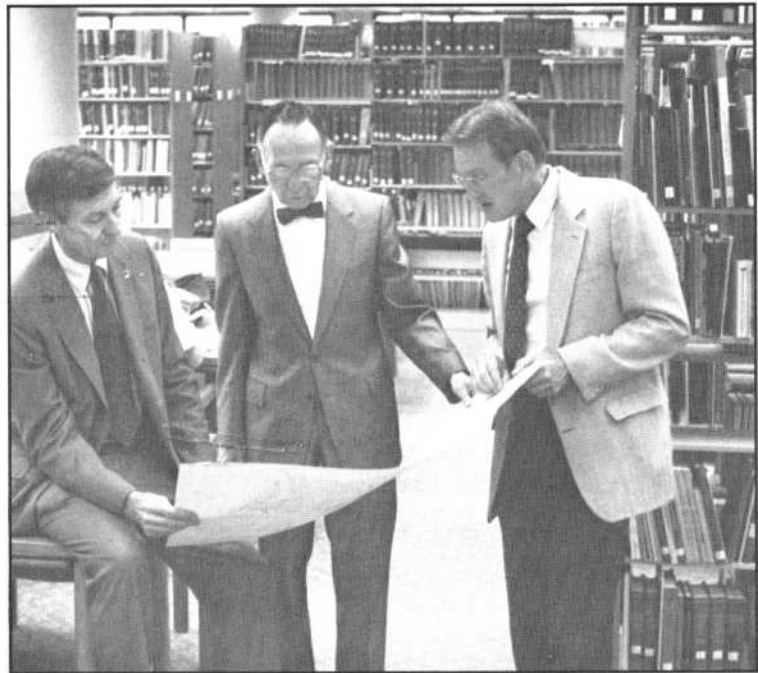
The Energy Center Tower, the construction of which is nearly completed, will house the Geosciences Computer Network, the School of Geology and Geophysics, the School of Geography and the Institute for Dry Land Development. In addition, the tower will house the College of Geosciences offices, some laboratories, the offices of Energy Center Director Groten, the School of Meteorology, the

Oklahoma Climatological Survey, the Cooperative Institute for Applied Remote Sensing and the Cooperative Institute for Mesoscale Meteorological Studies.

What does meteorology have to do with energy? James Kimpel, dean of the College of Geosciences, says the relationship is direct.

"For example, weather, to a large part, determines energy demand," Kimpel says. "Also, an important aspect of energy exploration and production is preserving the quality of the environment."

Together, the academic components of the Energy Center go beyond the bricks and mortar of the Energy Center building. The research and



**ABOVE:** Three key players in the academic life of the Energy Center meet in the Laurence S. Youngblood Energy Library (from left), chairman James M. Goodman, geography, and directors Raymond D. Daniels, chemical engineering/materials science, and Claude E. Duchon, meteorology.

**LEFT:** Geosciences Dean James F. Kimpel, whose college is one of the major occupants of the Energy Center, pauses in the upper hallway to visit with the new facility's administrator, Barnet Groten.

educational programs within the building will compose the true Energy Center.

"The building is not the end result," Groten says. "When the building is finished, the Energy Center program is just beginning. The main challenge we have now is convincing everybody that the Energy Center is a concept as well as a place."

The objectives of the OU Energy Center, as outlined by Groten in 1989, are to:

1) Establish an environment that encourages interdisciplinary research into energy matters;

2) Build on OU's research strength, developing broad multi-disciplinary educational programs in energy at the undergraduate, graduate and continuing educational levels;

3) Establish the OU Energy Center as an internationally recognized center of energy expertise, providing a meeting ground where private, public and academic sectors can interact on important energy issues;

4) Facilitate the transfer of energy-related discoveries into new businesses.

Two important goals of education are to give those who seek it an occupation and to give the public the fruits of that person's occupation. But the process always has been seen in two distinct steps: first a person goes to college, then into a business. Also, as the generation of knowledge expands, there is a growing need to continue "learning" throughout a career.

At the Energy Center, the relationship between the University and outside industry will be reaffirmed. Researchers from energy-producing companies will conduct research in cooperation with the Center, and with OU's instructors and graduate students. Wisdom from the practical world of business and industry will meet the cutting edge of new thought in university research.

"Outside industry is already here," Kimpel says. "First of all, they have, in some cases, supported the construction of the Energy Center building. They have supported the access of teaching and computing equipment; the Geosciences Computer Network



Oklahoma Geological Survey Director Charles Mankin (second from right) gives Ronald Evans (left), director of petroleum and geological engineering, and Engineering Dean Billy Crynes (right) a tour of Survey cartographer Wayne Furr's department in the recently completed subterranean base of the Energy Center.



Jason Anderson (right) works in a chemical engineering lab with Assistant Professor Lance Lobban. Both sophomores in the OU Honors Program, Anderson and Richelle Ozbirn received the first two Energy Center Summer internships.

started with a million-dollar gift from Shell and was expanded after that. The Keck Foundation also invested in our computer system."

Kimpel says industries want today's university students, who are their future employees, to be familiar with the latest techniques and equipment used by the energy businesses. And when a company supports research at the university level, that company also receives a payoff in being in on new discoveries and new methods developed as a result of its contribution.

One of the first steps planned in the direction of a greater industry-university relationship is an Energy Research Consortium, Groten explains.

"There has been, historically, a lot of industry-supported research in the various energy disciplines," Groten says. "I'm trying to enlist a series of companies to do what I call 'joint venture' research here at the University."

In the past, Groten says, the pattern of research in the private sector has been one in which companies send research funding to the University, the only objective being to spend it on a discipline in a general area of the industry's concern. This type of support is drying up, Groten says, and we need to respect that.

Groten wants the relationship between academia and industry to evolve into more side-by-side research between industry and the University—more interaction.

"The thing I am looking for is a joint venture," Groten says. "In a joint venture of any kind, two or more parties come together, each with a particular contribution, and they both go away stronger for it."

The research could be undertaken in the University's laboratories or in the laboratories of the companies belonging to the consortium, or both. The end result will be of mutual benefit, Groten says.

"Instead of contracting with the University to do something for them while (the companies) go and do something else, we are saying 'Let's work together. If you have a better scientist in your labs on this particular point, and we have a better scientist on

another point, let's find the answer together.'"

But how can one get several companies, who are competing with one another in the business world, to work together in the academic world? Who has the rights to future discoveries?

Traditionally, companies conducted their own research, because they wanted to protect the proprietary value of the discoveries they made. But as the energy world at large has become more complicated, so has the research world. A company holding the sole rights to research findings may or may not profit from those conclusions. The expense of research makes investing in a consortium on a university level a sound economic solution to the problem of research expense.

"You can take four companies and show them the same piece of technology," Groten says. "One will make money, one will lose money, and the other two won't be able to make up their minds. It depends on what they want to do with technology to turn it into future income. That's where they should compete. Where they shouldn't compete, because it is too expensive, is in the development of the idea itself."

In addition to a consortium, the Energy Center also will be involved in future International School for Hy-

drocarbons Short Courses, an annual event sponsored by the School of Chemical Engineering, Crynes says.

will be even more so a focus of education. Students who seek degrees in the energy-related disciplines will benefit directly from the cross-flow of ideas that will come from the mixing of educational programs under the Energy Center concept.

Research is the vehicle that will bring students of the different energy disciplines together. Students who work together through research can focus on what knowledge they will need to solve a problem, not just complete degree requirements particular only to their discipline. Learning in the Energy Center will begin to follow the dictates of "themes" rather than degree requirements alone.

"There are going to be themes we can share across disciplines," Kimpel says. "One is using remote sensing techniques to study the earth's atmosphere and the land's surface. Another is computing. The computational aspects of several disciplines are similar."

For instance, Kimpel points out, meteorology students using remote sensing techniques, including weather radar and satellites to study the earth's atmosphere, may have knowledge useful to geology students studying the land's surface. The geology students, in turn, may need computer students to interpret information collected from the satellites.

*"I'm trying to enlist a series of companies to do 'joint venture' research here at the University."*

drocarbons Short Courses, an annual event sponsored by the School of Chemical Engineering, Crynes says.

The short course brings more than 1,000 people from all over the world to OU each year to discuss the latest discoveries and techniques in the field of energy measurements research.

"It has been going for 60 or more years," Crynes said. "That probably makes it the biggest and oldest (energy short-course) in the world."

While the Energy Center will be a focus of energy industry research, it

"What the world needs for the 1990s is people who are both educated and doing research. I don't separate the two, they go hand in glove," Groten says. "You are not going to educate competitively unless you do research."

Groten says he eventually wants to take Energy Center education past the degree programs traditionally considered to be energy-related to others where the connection to energy previously has had little emphasis.

"We want to increase the energy literacy of students, not just those in the



**ABOVE: Representatives of the Energy Center, the education college and the Washington-based Close Up Foundation brief OU President Van Horn and Provost Joan Wadlow on plans for a national jointly sponsored program in energy concerns for high school students and teachers.**

energy fields but across campus to the greatest extent possible," Groten says. "We would like to expand eventually to have energy-related course work in just about every undergraduate field here."

In addition to chemists, geologists and engineers, the energy field needs economics majors, law school graduates, biologists and meteorologists. Even though it may not be apparent at first, there are also ready applications in the energy world for political science majors, linguists—even for people in the fine arts.

For instance, Groten says, little art work has been done in the area of energy, something he hopes to remedy someday.

"Art looks for themes," says Groten, himself a photographer in his spare time. "There are a lot more interesting things in energy beside the old photograph-of-an-oil-derrick-at-sunset. Energy pervades all of life. There is nothing that happens that doesn't have an energy content to it. What greater challenge to an artist than to extract some of the subtleties of energy in our lives?"

The first steps of this truly non-disciplinary approach began last summer. Two OU honors students were chosen for Energy Center internships. Jason Anderson and Richelle Ozbirn studied at the center and completed

selected readings in energy-related subjects. Their studies and research will continue over a three-year period and will examine in detail energy technologies and issues.

Groten says that in the future, the universities—not only in Oklahoma but throughout the United States—have enormous potential for taking the lead in economic development. The reason for that increased opportunity is that the main role of the university is producing ideas.

"Knowledge workers" are those who produce valuable, salable knowledge — perhaps indistinguishable from what was known once as "good old American know-how." Such intellectual property, as Groten calls it, will generate wealth from ideas rather than from resources.

"This is where the Energy Center can help," Groten says. "I see the utilization of the remaining energy supplies in this state as being the bridging activity toward building Oklahoma's future. The worst mistake we could make would be to count on the future as only being able to produce and sell resources. We've got to use the time and resources we have left to develop the ability to turn out the best knowledge workers in the country. Then we will have provided the roots for growth in the next 100 years." 