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Scientists expect hydrogen to serve as alternate energy

By Timothy J. Hammons
Staff Writer

In the face of the oil embargo during the mid-70s, researchers began looking for alternatives to crude oil. One of the alternatives is a hydrogen economy.

Hydrogen can be used in fueling automobiles and jets and creating electricity.

William B. Craven, manager of Texas A&M's Center for Electrochemical Systems and Hydrogen Research, said there is an abundant supply of hydrogen and a limited supply of crude oil.

The center, a department of the Texas Engineering Experiment Station, is recognized as the leading institute in the United States in hydrogen research.

Craven said Prudoe Bay, Alaska was supplying one-third of the United States' oil two years ago. In four years Prudoe Bay will be producing little, if anything, he said.

Knowing this, an alternative will be necessary. Craven said hydrogen is the best alternative for supplying energy needs.

"We can take hydrogen and use it anywhere that hydrocarbons, gasoline and diesel fuels are used," Craven said.

Hydrogen is an abundant medium of energy and a type of fuel everybody can use, he said. Hydrogen is obtained from water through a process called electrolysis.

Craven said the best fuel to use is hydrogen. There is an abundant supply of hydrogen and it burns much cleaner than hydrocarbons, he said.

Texas A&M is currently working on a hydrogen car with plans to help bring about the hydrogen economy.

For transportation purposes, hydrogen can be used in automobiles in two ways.

The first is in the internal combustion engine, the same way gasoline is used. The second is through the use of fuel cells.

David Swan, director of the project at Applied Research Corporation, said hydrogen is a renewable medium. He said hydrogen is a medium because it takes electricity to produce it, whereas coal and natural gas are energy sources.

Applied Research has a hydrogen fuel car — a Chrysler LeBaron converted to run on hydrogen along with gasoline.

Swan said they have run into several problems with the LeBaron. One problem is that the hydrogen causes the car to backfire through the intake manifold. He said this problem has been partially corrected. The other problem is a 60 percent to 70 percent power loss, he said.

Another problem with the LeBaron is cost if gasoline. When equating the cost of hydrogen to gasoline, it comes to about two dollars a gallon of gasoline, Swan said. The price is calculated through the conversion process at local electricity costs, he said.

This expense is the reason Applied Research is looking to use hydrogen in vehicles with a fuel cell. The fuel cell would make the vehicle about three times more efficient than the internal combustion engine and would produce no air pollution.

The fuel cell works in the reverse of electrolysis. Hydrogen is pumped in, and through a chemical reaction, electricity is produced.

Swan said the idea is to develop a car powered partly by the fuel cell and partly by batteries. This is why Applied Research also has several battery-powered cars.

Swan said they have two Dodge vans, a Lynx Ev and a General Motors Ev that are battery powered.

With the exception of the GM they are all owned by the University.

Swan said he has talked to several companies who have used battery-powered vehicles and the conclusion is always the same: The batteries are inefficient.

The Lynx Ev can only travel 25 miles before it has to be recharged, he said. This is equivalent to one gallon of gasoline. It takes about five hours to recharge the batteries.

This high inefficiency is one reason why Applied Research is looking to use a battery-fuel cell combination. The combination of up with one fuel cell and several batteries. During acceleration the fuel cell and batteries help power the car. While the car is at a constant speed or parked, the fuel cell continues to operate and recharges the batteries, Swan said.

In this setup, the car will be traveling a distance of 100-plus miles and will operate at an equivalent of \$1 a gallon of gasoline, he said.

At this price, the car will be economical and will help reduce the effects of air pollution.

Swan said GM is looking into fuel cells for an auxiliary power supply. The fuel cell will be put into luxury cars to allow the car to continue to run without running the engine. He said that with on-board computers the owner will be able to set the time for the air conditioner to come on, so when he comes out to work, he'll have a cool car.

Although the hydrogen sounds like the answer, fully developed fuel-cell cars will not be available this century, Swan said. The work being done today is for the future. The work is something that is to be started now, so when the time comes, the information will be available, he said.

Petroleum engineering alive despite changes in oil world

By Sherri Roberts
Staff Writer

Oil — the black gold commodity — became the backbone of the Texas economy, establishing Texas in a race with Alaska to be the largest oil-producing state in the nation.

The Organization of Petroleum Exporting Countries' ability to produce inexpensive oil because of its member countries' high-capacity wells has allowed it to hold the world oil industry in a tight grip.

The faltering of the industry has led to a redirection for Texas A&M Department of Petroleum Engineering.

William Von Gonten, professor and head of the petroleum engineering department, said undergraduate enrollment decreased from 1,600 students in 1981 to 184 students in 1988. But graduate enrollment helped offset that by increasing to 184 students from only 25 students in 1981.

Not only have faculty requirements remained constant, he said, but a greater emphasis has been placed on the graduate program.

Von Gonten said many graduate students chose to enroll in the program because of stricter education requirements demanded by oil-related companies.

Companies have become more efficient and technologically oriented in an effort to reduce costs and increase the quality of productivity, he said.

Graduates of A&M's petroleum engineering department, which is ranked first in the nation in terms of quality and enrollment, are popular recruits for many of these companies. The average starting salary for

petroleum engineering students receiving a bachelor's degree is \$43,000, he said.

Seventy percent of the department's undergraduate students last May had jobs waiting for them, Von Gonten said, while 100 percent of those graduating with a master's degree had jobs.

Though the current number of graduates meets market demand equally, Von Gonten said there will be a shortage of graduates needed to meet the demand in 1989 unless enrollment figures increase.

These enrollment figures, though low in comparison to those of 1981, are equivalent to figures in the mid-70s, Von Gonten said. The Arab oil embargo and the 1981 oil boom were situations which created unusual peaks in enrollment, he said.

While Texas, Louisiana and California — states with heavy stakes in the oil industry — are negatively impacted by the weakened state of the industry, the rest of the country is benefitting.

Von Gonten said states with strong manufacturing bases, in addition to many other consumers, welcome the cheaper oil prices.

The effects of the crisis have forced Texas legislators to examine alternate routes to economic stability. With this examination, higher education has emerged as part of the solution to the problem.

While visiting A&M last October, Lt. Gov. Bill Hobby commended the University for its biotechnology research plans in Houston. Hobby said the research will create dozens of new products and thousands of new jobs.

Hobby said the prosperity created

by universities justifies their expense.

But Stan Carpenter, an assistant professor of educational administration, said education lobbyists are making idealistic promises they can't keep.

Carpenter said higher education is only part of the answer to solve the state's economic woes. Higher education alone, he said, can't change the economy's structure in 10 years.

Carpenter said the political pressure was leading many University faculty to question their priorities. He said the temptation to renege more funds may cause research agenda to be dictated by economic wants.

The economic strain has had an additional effect on higher education, Carpenter said. Attracting professors to Texas' universities has become increasingly difficult, he said. Professors read of the state's struggles, he said.

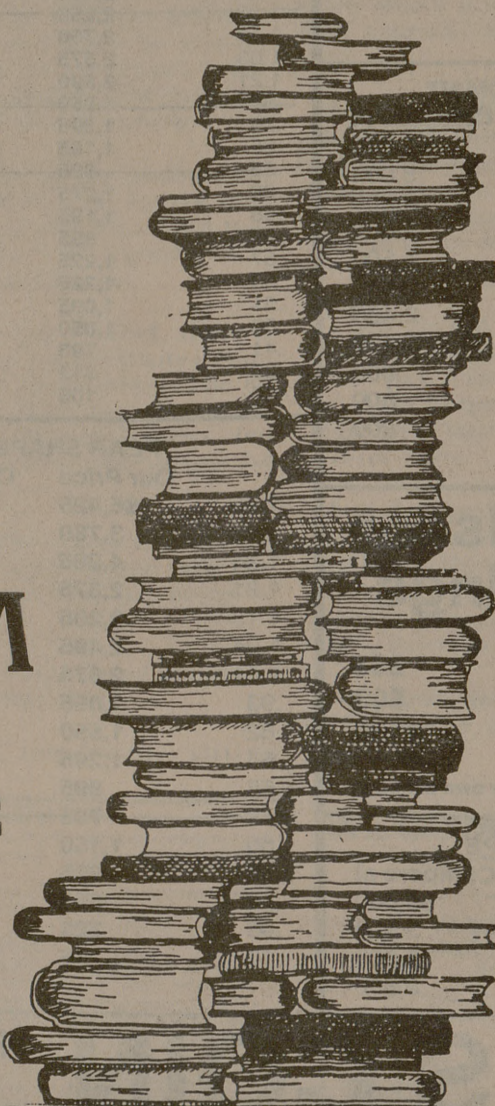
He said that many of the pressing smokestack states have taken advantage of the situation by luring faculty away from Texas with more lucrative offers.

The University counterattacks faculty raiding through its "repellent" fund. The fund is used to match promising offers from other universities.

Larry Dooley, senior academic business administrator, said retaining quality faculty in Texas universities is an important key to growth.

"If you lose good student faculty, you lose good industry," Dooley said.

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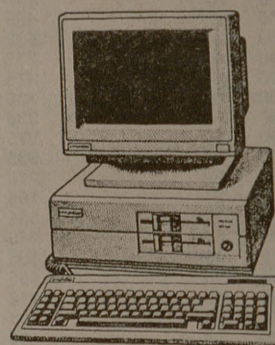


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