

## NEW ENERGY IN THE ENERGY CAPITAL ALTERNATIVE ENERGY INITIATIVES ARE ALIVE AND WELL



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By Amy Myers Jaffe and Rikk Alessi

Houston is often called the "energy capital" of the world. The city is well known as the location of many oil and natural gas companies and oil field service companies, but what is less well known is that Houston is emerging as a center for alternative energy companies as well. Wind, solar, fuel cell and biofuels companies are popping up around town and have even created their own business network group. The newly formed Houston Renewable Energy Network has over 100 members on its list-serve now and meets quarterly for networking and expert lectures. Members include Houston and other regionally based companies in the wind, solar and biofuels business.

### INITIATIVES ABOUND

Some 30 wind energy developments have been implemented in Texas since 1992, including 14 projects initiated starting in 2005. There are three additional projects under construction currently. Owners of the developments include American National Wind Power/Oregon Energy, York Research, Cielo Wind Power, American Electric Power, FPL Energy, Shell, DWS/John Deere Wind Energy and Horizon Wind Energy. Texas Wind capacity currently stands at 2370 MW, up from 180 MW in 1999.

To tap growing business opportunities for renewable energy in the United States, BP also announced in October that Houston will be the headquarters for BP North America Alternative Energy, a business unit created in 2005 to develop low and zero carbon emissions-based power generation from wind, solar, hydrogen power and natural gas fired plants. The new business unit has an energy team of 85 executives and will be based in downtown Houston.

BP North American Alternative Energy oversees the company's gas-fired power facilities at its refineries in Texas City and Los Angeles as well as a cogeneration facility under construction at BP's refinery in Washington state. The company has plans to build an industrial scale hydrogen power plant with carbon capture in California. BP Alternative Energy has also entered into a strategic alliance with Clipper Windpower for joint development of five wind power projects in the United States. BP has also purchased Greenlight Energy Inc., a U.S.-based wind developer.

### BIOENERGY AS VIABLE ALTERNATIVE

Another emerging area for renewable energy around Houston is bioenergy. Rice University recently convened a major conference called "Biomass to Chemicals and Fuels: Science, Technology and Public Policy." The conference, sponsored by the James A. Baker III Institute for Public Policy and Rice University's departments of Civil and Environmental Engineering, Chemical and Biomolecular Engineering and the Energy and Environmental Systems Institute, investigated the potential for biofuels to contribute to U.S. energy security and to highlight the research and development of new technologies and scientific breakthroughs needed to make biofuels a viable alternative to oil-based fuels.

Among the conference keynoters were William McCutchen, deputy associate director, Texas Agriculture Experiment Station, who outlined Texas efforts to initiate major Texas research on cellulosic biomass conversion; and William Spence, CEO of Galveston Bay Biodiesel, a developer and operator of biodiesel facilities, including the new Bioselect plant, located in Galveston, Texas. The plant's first 22 million-gallon-per-year unit will come online in November 2006. The company has plans to manufacture over 100 million gallons a year, making it one of the largest biodiesel producers in the United States. U.S. biodiesel production was estimated at 150 million gallons in 2006, according to the U.S. Department of Energy.

Another local company, Houston Biodiesel, also plans to build a biodiesel plant in Seabrook, Texas, working

together with Lansing Ethanol Services LLC and Lansing Trade Group LLC, capable of producing 35 million gallons a year. Houston Area Research Center (HARC) also has a Southwest Biofuels Initiative aimed to accelerate the commercialization of biofuels and work on projects to demonstrate the practicality of biofuels. Its Biofuels Feedstock Initiative established a biofuels manufacturing facility in The Woodlands to test a variety of biofuel feedstocks.

### STUDENT PROJECT

On a more grassroots level, the Rice University Biodiesel Initiative is producing biodiesel from waste cooking oil from Rice University kitchens to fuel engines from the lawn facilities fleet, a campus van and eventually campus shuttle buses. The student-based initiative is supported by Rice's Shell Center for Sustainability and the Rice engineering department and is designed for education and research by Rice students and faculty.

### HYDROGEN-GENERATION TECHNOLOGIES

With an experienced base of hydrogen producers and users nearby at the ship channel, hydrogen fuel cells are another area of innovation being developed in Houston. Houston-based alternative energy tech venture capitalist Contango Capital Management created an \$8.25 million fund last year focused on the development of hydrogen generation technologies and fuel cell products.

Other large firms are also getting into the act, with major players such as General Motors and Dow Chemical looking at fuel cell ventures in Brazos county. The two firms teamed to install a fuel cell in a Dow plant in Freeport, Texas, to prove the viability of hydrogen fuel cells for a large scale industrial power system. The project aims to power the equivalent of 25,000 homes by the end 2007. Hydrogen is a byproduct of Dow's chemical manufacturing.

### HOUSTON AT THE CUTTING EDGE

All these businesses and others like them give Houston the opportunity to remain at the cutting edge of the energy business by positioning itself as the major player in new energy technologies, not just technologies for oil and gas extraction. Development of alternative energy businesses will allow Houston to be better positioned to compete in the changing worldwide energy business.

Today, there are hundreds of millions of federal dollars being distributed for energy technology-related research. For these dollars to come to the Houston region, government, business and local universities must forge partnerships for research and methods of commercialization. Otherwise, federal dollars will increasingly go to places like California, Wyoming and Indiana.

Despite Houston's position near major coal resources and a giant electricity industry, two major national clean coal pilot projects have been established in other localities. National hydrogen and fuel cell initiatives are also based elsewhere, and there is talk that major federal biofuels initiatives will be centered in the Midwest or West coast.

Houston is well-positioned to lead the way in energy science and technology. One important step is to recognize the potential for nanotechnology for the energy industry—including its role in enhanced hydrocarbon extraction, carbon sequestration, hydrogen technologies, renewable energy and innovative hardware and software for distributive generation.

To secure its position in future energy, the city needs to get out in front as a center for innovation in energy technology as it is doing in the medical field. Prominent Houstonian Matthew Simmons has posited the possibility that Houston could be the site for private labs conducting pioneering science research, similar to Tuxedo Park, New York in the 1920s, 30s and 40s that led to breakthrough developments in radar and nuclear physics.

Houston is on the move in the alternative energy arena, but the public policy framework for our future role as energy capital is critical. Houston needs tax incentives and other drivers to direct investment in future technologies. It should also expand the research and development infrastructure of the area and promote institutions that link businesses to technology. It should prominently host international energy technology and innovation meetings.

Houston has the potential to be the most visible, proactive innovator in world energy. Houston is the energy capital of today and tomorrow.

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