

Energy Industry Overview

Houston is the U.S. energy headquarters and a world center for virtually every segment of the petroleum industry.

- Forty-eight percent of the region’s economic base employment — those sectors of the local economy that export goods and services outside the region — is related to energy, according to the University of Houston Institute for Regional Forecasting.
- This concentration of oil expertise and experience has meant a large number of relocations to Houston nearly every year since Shell Oil left New York for Houston in 1971. Energy firms relocating to Houston in recent years include:
 - Heartland Oil and Gas Corporation relocating its corporate headquarters from Denver;
 - CITGO relocating its corporate headquarters from Tulsa;
 - Schlumberger relocated its corporate headquarters from New York;
 - Parker Drilling Co. relocating its headquarters from Tulsa;
 - Chevron and Phillips combining worldwide chemical operations into a 50/50 joint venture based in Houston;
 - ConocoPhillips choosing Houston as headquarters after the merger;
 - GlobalSantaFe relocating its corporate headquarters from Dallas;
 - Noble Affiliates Inc. moving to Houston from Ardmore, OK.; and
 - Direct Energy relocated its headquarters from Stamford, CT.
- More than 3,000 energy-related establishments are located within the Houston Metropolitan Statistical Area, including more than 500 exploration and production firms, more than 150 pipeline transportation establishments and hundreds of manufacturers and wholesalers of energy-sector products.
- Houston is home to 41 of the nation’s 147 publicly traded oil and gas exploration and production firms, including 10 of the top 25.
- The Texas Gulf Coast has a crude operable capacity of 4.081 million barrels of refined petroleum products per calendar day — 85.9 percent of the Texas total and 23.2 percent of the U.S. total.
- The logistics for moving much of the nation’s petroleum and natural gas across the country are controlled from Houston. Twelve of the nation’s top 20 oil pipelines have corporate or divisional headquarters or ownership interests in Houston, controlling 87,108 miles of U.S. pipeline or 59.2 percent of U.S. capacity.
- Fifteen of the nation’s top 20 natural gas transmission companies have corporate or divisional headquarters in Houston, controlling 152,779 miles of U.S. pipeline and 79.5 percent of U.S. capacity.
- In July 2008, the Houston MSA had 28.9 percent of the nation’s jobs in crude petroleum and natural gas extraction (47,000 of 162,800) and 13.2 percent of jobs in support activities for mining (42,900 of 325,400).

Energy Industry Firms

Houston's corporate roster reads like a "who's who" of the nation's energy industry.

LARGEST HOUSTON AREA ENERGY FIRMS		
Oil and Gas Companies	Local Employees	2007 Gross Annual Revenue (Millions)
Anadarko Petroleum Corp.	1,900	\$15,892.0
Apache Corporation	600	9,977.9
BHP Billiton Petroleum	350	47,473.0
BP America	8,000	2,614.5
Cabot Oil & Gas Corp.	374	732.2
Chevron	6,000	220,904.0
CITGO Petroleum Corporation*	300	(2004) 32,027.6
ConocoPhillips	3,500	194,495.0
Devon Energy Corporation	1,143	11,362.0
Enbridge Energy Partners	450	7,282.6
EOG Resources, Inc.	350	4,190.8
EV Energy Partners LP	335	104.0
ExxonMobil	5,800	404,552.0
Hess Corporation	1,000	31,647.0
Hilcorp Energy Company	213	9.2
Marathon Oil Corporation	1,100	65,207.0
Motiva Enterprises LLC*	2,000	(2004) 24,400.0
Newfield Exploration Co.	871	1,783.0
Noble Energy, Inc.	350	3,272.0
Plains All American Pipeline, L.P.	300	20,394.0
Shell Oil Company	13,000	5,347.5
TOTALS	47,936	\$1,103,667.3

LARGEST OIL AND GAS FIELD EQUIPMENT AND SERVICE COMPANIES

Oil and Gas Supplier and Service Companies	Local Employees	2007 Gross Annual Revenue (Millions)
Baker Hughes Incorporated	7,000	10,428.2
BJ Services Company	697	4,802.4
Cameron International Corp.	2,100	4,666.4
CGG Veritas, Inc.	650	3,498.6
FMC Technologies	1,000	4,615.4
Halliburton	5,473	15,264.0
KBR	2,499	8,745.0
Nabors Drilling USA, Ltd.*	1,165	(2005) 3,551.0
National Oilwell Varco	5,000	9,789.0
Oceaneering International, Inc.	1,005	1,743.1
Oil States International, Inc.	1,340	2,088.2
Pride International	200	2,043.8
Schlumberger Limited	4,850	23,708.0
Smith International, Inc.	2,645	8,764.3
Stewart & Stevenson LLC	1,475	1,335.4
TenarisHydril Company	945	503.0
Transocean Inc.	577	6,377.0
VetcoGray Inc.	1,000	5,911.7
Weatherford International Ltd.	3,000	7,832.1
Wilson Supply	624	1,600.0
TOTALS	43,245	123,715.6

Note: Selected by employee count but listed alphabetically.

* These companies are subsidiaries or joint ventures of foreign companies; therefore, an information lag exists.

Sources: *Business Houston-Gateway to Global Markets 2007*, Greater Houston Partnership Databases, Hoovers

Energy Headquarters

Houston is home to 41 of the nation's 147 publicly traded oil and gas exploration and production firms, including 10 of the top 25.

PUBLICLY-TRADED U.S. OIL AND GAS COMPANIES HEADQUARTERED IN HOUSTON			
Rank ¹	Company	Rank ¹	Company
2	ConocoPhillips	67	Dune Energy
4	Anadarko Petroleum Corp.	68	Goodrich Petroleum Corp.
5	Marathon Oil Corp.	71	Meridian Resource Corp.
11	El Paso Corp.	76	Crimson Exploration Inc.
13	EOG Resources Inc.	88	Platinum Energy Resources Inc.
14	Noble Energy Inc.	90	Contango Oil & Gas Co.
16	Plains Exploration & Production Co.	99	Petro Resources Corp.
19	Apache Corp.	101	New Century Energy Corp.
20	Newfield Exploration Co.	102	Westside Energy Corp.
24	Helix Energy Solutions Group Inc.	103	PetroSearch Energy Corp.
26	Petrohawk Energy Corp.	108	Evolution Petroleum Corp.
28	Southwestern Energy Co.	113	Adams Resources & Energy Inc.
29	Cheniere Energy Inc.	117	Houston American Energy Corp.
37	ATP Oil & Gas Corp.	119	EnDevCo Inc.
40	Cabot Oil & Gas Corp.	126	Index Oil and Gas Inc.
44	Swift Energy Co.	130	Blue Dolphin Energy Co.
47	Ultra Petroleum	131	Lucas Energy Inc.
51	W&T Offshore Inc.	137	Apache Offshore Investment Partnership
52	Rosetta Resources Corp.	138	LL&E Royalty Trust
61	Edge Petroleum Corp.	144	Bayou City Exploration Inc.
63	Carrizo Oil & Gas Inc.		

¹Ranking by total assets in 2007 among 147 firms listed.
Source: *Oil & Gas Journal*, September 15, 2008

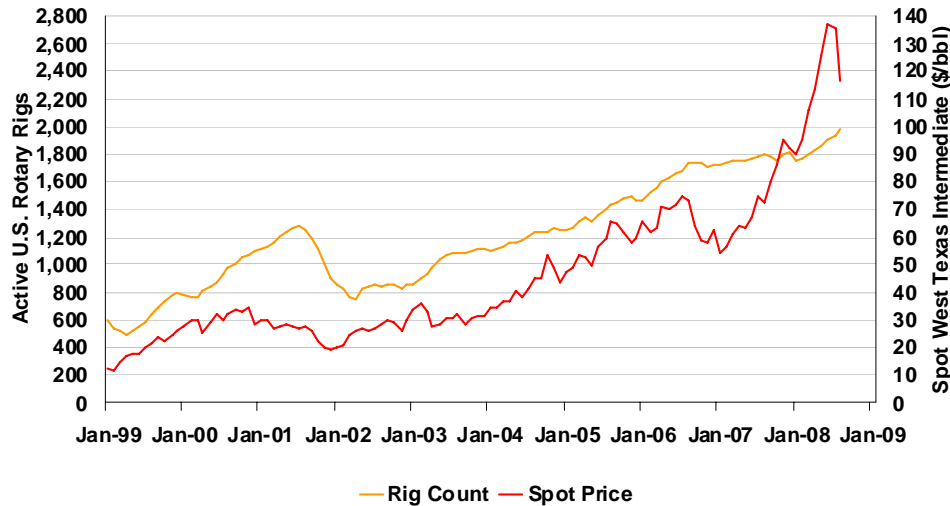
- Other major companies with significant Houston operations include ExxonMobil, Chevron, Devon Energy, Occidental Petroleum, Hess, and Dominion.
- International oil and gas companies with significant Houston operations include Shell, BP, Motiva, BHP Billiton and CITGO.

Drilling Activity and Oil Price

Rising energy prices have sparked increased drilling over the past six years.

Drilling Activity and Oil Price

1999-2009

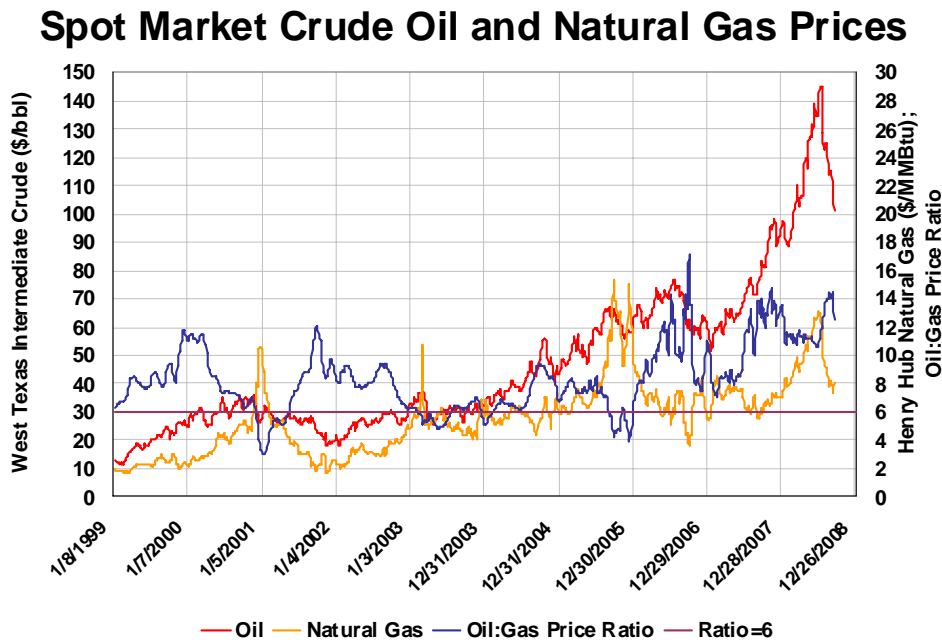


Sources: Baker Hughes Incorporated, Energy Information Administration, Sep 2008

- In the years following the '82 oil price collapse, exploration and production adapted to historically low real energy prices. Much of the decline in the rig count since the record high of 4,520 in December '81, though, reflects not low prices, but rather technological advances that have dramatically increased exploration efficiency and decreased finding costs.
- Weaker than expected worldwide economic growth and a faltering domestic economy in '01, coupled with increased conservation in the wake of price spikes for natural gas and electricity in late '00 and early '01, took their toll on drilling activity. The count of active domestic rotary rigs peaked at 1,293 in July '01 and then fell 35 percent by mid-'02.
- By March '05, the rig count had more than recouped all of that loss, and since then has risen another 52 percent. Since the low near \$54 in January '07, the price of oil has more doubled and the rig count — now at its highest level since '85 — has risen above 2,000.
- With worldwide demand growing rapidly and little surplus production capacity available, oil prices are likely to remain high. In addition to supply/demand fundamentals, though, high oil prices reflect geopolitical uncertainties and — since oil trades are dollar-denominated — the decline of the dollar. Natural gas prices, which reflect a more localized and a more weather-sensitive market than oil, promise to be less volatile than over the past few years. In its September *Short-Term Energy Outlook*, the U.S. Energy Information Administration forecasts that spot prices in '08 will average \$115.81 per barrel for West Texas Intermediate and \$9.71 per million Btus for Henry Hub natural gas. EIA expects the annual average price for WTI to rise further to \$126.50 in '09, while the annual average price for Henry Hub gas slips 12 percent to \$8.55.

Oil and Gas Prices

Oil prices have risen sharply since '06, and natural gas prices have followed.



Source: U.S. Energy Information Administration

- The Friday spot market closing price for a barrel of West Texas Intermediate, the benchmark U.S. light crude oil, shot past \$80 in September '07 and \$90 in October to flirt with \$100 in December, and topped \$140 in July before falling back into the low \$100s in September.
- The spot price for natural gas peaked in September '05 at \$15.27 per MMBtu, up 182 percent over the year. With gas in storage slightly above the five-year average for this point in the year, concerns over supply have eased in recent weeks, and prices have receded from their recent highs.
- Growth in the demand for oil — especially from China, India and the Middle East — until recently threatened to outstrip supply. The world's scant surplus production capacity is in Saudi Arabia, and non-OPEC capacity additions through the end of this year promise little relief, but downward revisions to forecasts of worldwide demand growth have eased some of the upward pressure on prices.
- In its September *Short-Term Energy Outlook*, the Energy Information Administration sees spot market prices for West Texas Intermediate averaging \$115.81 this year and \$126.50 in '09, versus \$72.32 last year. It also expects the Henry Hub spot price for natural gas, which averaged \$7.17 per MMBtu last year, to average \$9.71 this year before sliding to \$8.55 next year.
- Gulf Coast petrochemicals manufacturers, unlike many of their counterparts elsewhere, rely heavily on natural gas as a feedstock. As a rule of thumb, Gulf Coast petrochemicals plants can compete on the world market so long as the ratio of oil price to gas price exceeds 6. Over the past decade, as the graph shows, seldom has the ratio fallen below that level for an extended period.

Refining Capacity

The Houston area has nearly one-seventh (13.3 percent) of U.S. refining capacity, including the nation's largest and fourth largest refineries.

HOUSTON AREA REFINERIES DAILY CRUDE CAPACITY		
Company	Barrels/Day	City
ExxonMobil Oil Refining Supply Co	567,000	Baytown
BP Products North America Inc	467,720	Texas City
Deer Park Refining LTD Partnership	329,800	Deer Park
Houston Refining LP	270,600	Houston
ConocoPhillips Company	247,000	Sweeny
Valero Refining Co Texas	199,500	Texas City
Pasadena Refining Systems	100,000	Pasadena
Valero Refining Co Texas	83,000	Houston
Marathon Petroleum Co LLC	76,000	Texas City
Local Refining Capacity	2,340,620	
Local Capacity as % of U.S. Total	13.3%	
<p>Note: When the refineries in nearby Beaumont, Port Arthur and Corpus Christi are included, the Texas Gulf Coast has a crude capacity of 4.081 million barrels per day, or 85.9 percent of the Texas total and 23.2 percent of the U.S. total.</p> <p>Source: Energy Information Administration, 2008 Energy Rankings</p>		

- Petrobras, a Brazilian-owned oil company, bought a half interest in the Pasadena Refinery System's 142-acre site as part of its overall plan to increase its diesel and ethanol production by diversifying production streams. The plant now has a processing capacity of 100,000 barrels per day. The refinery plans to increase that capacity to 150,000 barrels per day and allow it to process heavier oil, such as Brazil's crude.
- Houston-based Shell Oil is set to begin construction on a 325,000 barrel-per-day expansion to its Motiva refinery in Port Arthur that will make it the largest in the United States. The expansion project, with a projected cost of \$7 billion, will increase the refinery's existing crude oil throughput capacity to 600,000 bpd from 285,000 bpd.

Energy Employment

Houston dominates national employment in the energy industry.

JOBS BY INDUSTRY SECTOR – JULY 2008			
Industry Sector	Jobs in U.S.	Jobs in Houston-Sugar Land-Baytown MSA	Houston Jobs as % of U.S.
Oil and Gas Extraction	162,800	47,000	28.9
Support Activities for Mining	325,400	42,900	13.2
Agricultural, Construction and Mining Machinery Manufacturing	247,700	31,500	12.7
Sources: U.S. Bureau of Labor Statistics, Texas Workforce Commission			

- Houston's strength in energy and related industries translates into the largest pool of energy industry talent in the country. This pool includes drillers, petroleum engineers, geologists, landmen, pipeline operators, and professionals who have developed energy-related expertise, such as accountants, attorneys, programmers, and secretaries.
- The Houston Metropolitan Statistical Area has more than 3,400 energy-related establishments, both upstream and downstream.

Alternative Energy in the Houston Region

Houston, the energy capital of the world, is diversifying its energy base into new and alternative energy technologies.

Solar

- Rice University has been selected by the U.S. Department of Energy to design, build and operate a fully solar-powered home. The project is part of the fourth Solar Decathlon to be held in Washington, D.C., in fall 2009. Rice, one of 20 university teams to compete, will receive \$100,000 from the DOE for the project.
- In the Upper Kirby area of Houston, construction is underway on what may be the city's only completely self-sustainable house. Houston Public Radio reports the house will generate all power and water through solar energy and rain. If all goes according to plan, the home could receive a Platinum rating by LEED standards, the nation's highest green rating.
- Houston-based Global Warming Solutions Inc., a developer of technologies aimed at mitigating the effects of global warming, has signed a collaboration agreement with Solar Wind Ltd., a Russian-based supplier of double-sided silicon solar cells.
- In 2008, Houston was recognized by the U.S. Department of Energy (DOE) as a Solar America City for its commitment and comprehensive approach to the deployment of solar technologies. The DOE awarded \$200,000 in funds to the City of Houston to develop a strategy and plan for solar infrastructure in the region. BP Solar will provide an additional \$200,000 in solar panels to the City of Houston as part of the matching requirement for the grant.

Hybrid Technology

- Mayor Bill White announced in April 2005 plans to convert a substantial portion of the City's fleet of cars, pickup trucks and sport utility vehicles to hybrids. As of July 2008, the City now has 500 hybrid vehicles with hopes to expand the fleet of hybrid vehicles to 1,500 by the year 2010. The City fleet comprises more than 11,000 vehicles of which 3,554 are the civilian, light-duty, "non-specialty" fleet.

Ethanol

- Houston's first ethanol (E85) fuel dispensing facility opened in October 2004 at NASA's Johnson Space Center. JSC is now the fifth NASA center to add ethanol fueling capability. JSC employees are now mandated to use E85 in the 25 Flexible Fuel Vehicles in the GSA fleet assigned for employee use, if their official business takes them within a 50-mile radius of JSC.

Hydrogen Fuel Cells

- The Woodlands-based Center for Fuel Cell Research and Applications is a multi-sponsor research consortium working to advance hydrogen and fuel cell technologies from lab to market. The Center offers two programs - one providing surveillance of early-stage technologies and the other providing operational verification of products emerging from late-stage developers and manufacturers.

Texas Wind Energy

Texas is leading the nation in wind energy development and production.

- At the end of 2007, Texas ranked No. 1 in the nation with installed wind power of 4,356 megawatts (and 1,238 under construction), far outdistancing California's 2,439 megawatts (and 165 under construction), according to the American Wind Energy Association.
- Texas has led the nation in wind energy generation for three straight years. About 26 percent of the country's wind power is currently generated in state according to the Texas Public Utility Commission.
- Texas officials approved a 4.93 billion dollar plan to build new transmission lines that bring pollution-free energy from West Texas to urban areas. The "renewable energy superhighway" is expected to boost Texas's wind-power capacity from approximately 5,000 megawatts to 18,456 megawatts. The new lines are expected to be in service by 2012. Public Utility Commissioner, Paul Hudson, states "the transmission plan is nothing short of extraordinary in terms of scope and magnitude."
- Texas has leased to Galveston Offshore Wind an 11,000-acre region of the Gulf of Mexico, seven miles off Galveston Island, for gigantic wind turbines that could eventually power 40,000 homes and generate millions of dollars for state schools. The project marks a new era of pollution-free energy production for the Gulf.
- A survey by Promark Research found that 93 percent of Texas voters strongly support the state government developing additional electricity sources to meet the increasing demand for power in Texas.
- The Lone Star Wind Alliance, a coalition of universities and government agencies led by the University of Houston and the Texas General Land Office, was named project co-finalist by the U.S. Department of Energy and the National Renewable Energy Laboratory. The Alliance was awarded a Cooperative Research and Development Agreement (CRADA) which will partially fund the construction and operation of an advanced wind turbine blade test facility.
- FPL Energy LLC, the nation's largest wind energy producer, will team up with Texas Christian and Oxford universities on a five-year study of wind power's ecological and socio-economic impacts.

Houston Wind Energy

Houston is emerging as a global center for wind energy.

- Houston City Council approved an amendment to the city’s electric supply agreement that will allow the city to contract to receive up to 50 MW of wind energy, which would supply about one-third of the 1.3 billion kWh of electricity required annually to power city buildings, street lights and municipal water plants. The deal structure will enable the city to diversify its fuel sources from fossil fuels, remove volatility from the city’s electricity budget and receive renewable energy credits.
- The City of Houston, recognized recently as a top local government purchasing green power, has also been named as a top green power purchaser among national entities. The Environmental Protection Agency ranked Houston No. 12 on the National Top 25 list of green power partners for using wind power for 20 percent of its purchased-electricity needs.
- The U.S. Department of Energy has agreed to partner with the University of Houston-led Lone Star Wind Alliance on one of two \$20 million large turbine-testing facilities. “Anyone building wind turbines will want to be next to this facility,” General Land Office Commissioner Patterson says. “Our facility will be a magnet for research and manufacturing. It will establish Texas as a worldwide leader in wind power for many years to come.”
- In late 2006, the Port of Houston Authority signed a three-year agreement with Direct Energy for retail electric service to provide 129 kilowatt-hours, 5 percent of which will come from wind generation. The agreement continues the port’s efforts to maintain an environmental management system that includes air emissions reduction, solid waste recycling, storm water quality improvement and energy efficiency.
- The Greater Houston Partnership’s 2008 presidential energy summit focused not only on traditional oil and gas, but also on power from wind, biofuels, fuel cells, and nuclear and solar energy.

Houston Wind Energy: Private Sector

Investor confidence in Houston drives wind energy development for the region.

- GE announced a \$300 million investment in Houston-based Horizon Wind. The Horizon investment is part of GE's effort to increase its renewable energy investing goal for 2010 from \$4 billion to \$6 billion, said Alex Urquhart, president and CEO of GE Energy Financial Services.
- After spending 90 percent of 2007 capital expenditures on a renewable fuels campus in Houston, Dallas-based GreenHunter Energy Inc. is sending another \$65 million in 2008 for the Houston campus—a biodiesel refinery and surrounding infrastructure and storage. GreenHunter Energy is counting on Houston, says CEO Gary Evans.
- A unit of Houston-based SUEZ Energy North America has been awarded a 20-year power supply agreement by New Brunswick Power Distribution and Customer Service Corp. valued at about \$508 million. SUEZ Renewable Energy NA will supply electricity to New Brunswick Power, located in eastern Canada, from a new wind farm project SUEZ will construct, own and operate.
- RBC Bearings Inc., a large publicly traded manufacturer of precision bearings and components, has selected Houston for its launching pad into the wind energy business. RBC is developing a \$17 million plant near Hobby Airport where it will manufacture slewing ring bearings that are used in wind turbines, as well as other machinery.
- Montgomery Energy Partners of Houston is partnering with the Denali Energy Co. of Baxter, MN, to develop a 1,000-megawatt wind power project in northwest North Dakota. The Hartland Wind project would be that state's largest wind farm and could become the largest in the country when fully built out.
- Beginning in 2008, Houston-based Gexa Energy will provide the City of Dallas with renewable wind power, according to Gexa representatives.
- AES Corp. has signed a seven-year deal to sell all of the electricity produced at its Buffalo Gap 3 wind farm to Houston-based Direct Energy, according to AES. Direct Energy is Houston's third largest utility provider and serves the Dallas-Fort Worth area.
- Houston based Shell WindEnergy Inc. has partnered with TXU Corp. subsidiary Luminant to develop a 3,000-megawatt wind project in the Texas Panhandle area. Through the joint venture, the two companies will work on the current project and identify other renewable energy opportunities in Texas.
- American Security Resources Corp. has formed a subsidiary to develop a residential wind turbine. The Houston-based holding company signed an agreement April 30 2007 for the American Wind Power Corp. to develop and commercially market a residential scale version of the Noble Wind Turbine.
- Houston-based electricity provider Gexa Energy LP signed on to supply Sheldon Lake, an outdoor education and recreation facility in Northeast Harris County, with wind-generated power.
- Traditionally oil and gas giants, both BP and Shell have established wind energy groups in Houston.
- Amerex Energy Services, a Sugar Land energy brokerage firm, initiated an innovative wind power deal that provides Baylor University with electricity for the next 10 years at an anticipated savings of \$2 million annually. Under terms of the contract, Baylor will pay about 6 cents per kilowatt hour beginning in July 2008 to purchase 104,000 kilowatts per hour annually.

- Vestas Wind Systems has announced that Houston will be the home of its North American research and development hub, to be fully operational by the end of 2010. The facility, which is expected to be sited in the downtown area, will open in 2009 and create at least 100 technical, high-end research jobs.

Houston Biodiesel Energy

Houston is emerging as a global center for biodiesel energy.

- Houston Biodiesel promotes the use of clean, renewable, domestically produced biodiesel in all diesel engines. The company also sells high quality biodiesel that conforms to ASTM specifications and invites consumers to make their own biodiesel in their "BIG" batch reactor.
- TexCom, Inc. is building and will operate a new 30-million-gallon-per-year biodiesel plant at the LBC Houston LP bulk liquids terminal in Seabrook, Texas. TexCom plans to construct the multi-million-dollar plant that will convert virgin soybean oil into biodiesel and use existing on-site storage capacity and other terminal facilities under a long-term lease from LBC.
- Houston's Green Earth Fuels produces diesel fuel made from vegetable oil at its Galena Park site. The facility will be able to produce nearly 90 million gallons a year of biodiesel, making it one of the nation's biggest plants of its kind.
- GreenHunter BioFuels is converting the former Channel Refining Corporation waste oil/chemical refinery, located near Galena Park at the Houston Ship Channel, to production of biodiesel and distillation of off-spec methanol streams from its own biodiesel production mix. Additionally, off-spec methanol acquired from third parties will be refined at this facility.
- The international focus on advances in biofuels and other clean technologies boosted venture capital investment in Houston-area companies to near-record levels in the third quarter of 2007.
- Chevron, through its subsidiary, Chevron Technology Ventures LLC, has taken a 22 percent equity stake in Galveston Bay Biodiesel LP. The Houston-based company constructed a biodiesel production and distribution facility in Galveston.
- Endicott Biofuels LLC, the Houston-based biodiesel plant constructor, received \$40 million in financing from Haddington Energy Partners III LP to fund a biodiesel and bioderived products plant. Endicott's first plant construction will break ground in 2008, with plans to wholesale the fuel to the developing biofuel brokerage market.
- The nation's largest biodiesel plant is located at the Houston Ship Channel, expanding Texas' lead as the biggest producer of the alternative fuel. The \$70 million facility, owned by GreenHunter Energy, can produce 105 million gallons a year of biodiesel, boosting the nation's capacity to make the fuel by nearly 5 percent. The plant's flexibility allows production of fuel from a wide range of animal fats and vegetable oils, both edible and inedible.