

**HOUSE COMMITTEE ON ENERGY RESOURCES
TEXAS HOUSE OF REPRESENTATIVES
INTERIM REPORT 2008**

**A REPORT TO THE
HOUSE OF REPRESENTATIVES
81ST TEXAS LEGISLATURE**

**RICK HARDCASTLE
CHAIRMAN**

**COMMITTEE CLERK
SHANNON SNEARY**



Committee On
Energy Resources

January 5, 2009

Rick Hardcastle
Chairman

P.O. Box 2910
Austin, Texas 78768-2910

The Honorable Tom Craddick
Speaker, Texas House of Representatives
Members of the Texas House of Representatives
Texas State Capitol, Rm. 2W.13
Austin, Texas 78701

Dear Mr. Speaker and Fellow Members:

The Committee on Energy Resources of the Eightieth Legislature hereby submits its interim report including recommendations for consideration by the Eighty-first Legislature.

Respectfully submitted,

A handwritten signature in black ink, appearing to read "Rick L. Hardcastle", written over a horizontal line.

Rick Hardcastle

A handwritten signature in black ink, appearing to read "David Farabee", written over a horizontal line.

David Farabee, Vice Chairman

A handwritten signature in black ink, appearing to read "Myra Crownover", written over a horizontal line.

Myra Crownover, CBO

A handwritten signature in black ink, appearing to read "Warren Chisum", written over a horizontal line.

Warren Chisum

A handwritten signature in black ink, appearing to read "Frank Corte", written over a horizontal line.

Frank Corte

A horizontal line representing a handwritten signature, appearing to read "Joe Crabb".

Joe Crabb

A handwritten signature in black ink, appearing to read "Yvonne G. Toureilles", written over a horizontal line.

Yvonne Gonzalez Toureilles

David Farabee
Vice-Chairman

Members: Warren Chisum, Frank Corte, Joe Crabb, Myra Crownover, Yvonne Gonzalez Toureilles

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INTRODUCTION

At the beginning of the 80th Legislature, the Honorable Tom Craddick, Speaker of the Texas House of Representatives, appointed seven members to the House Committee on Energy Resources. The committee membership includes the following: Rick Hardcastle, Chairman; David Farabee, Vice Chairman; Warren Chisum; Frank Corte; Joe Crabb; Myra Crownover; Yvonne Gonzalez Toureilles.

During the interim, the Committee was assigned seven charges by the Speaker: 1) examine issues related to electrical lines and abandoned equipment on oil and gas leases; 2) examine whether the Railroad Commission of Texas should regulate carbon capture; 3) Discuss further the issue of financial assurance in relation to oil and gas wells, and evaluate the current bonding structure; 4) Discuss alternative energy sources and how best to incorporate them into our traditional energy sector. Also study the potential benefits of biofuels in Texas, including Texas feedstocks best suited for biofuel production and synergies between that industry and traditional energy sectors. Develop recommendations for facilitating the growth of the biofuel industry in a manner that best positions Texas in the national market; 5) Research ways to maintain groundwater quality in relation to oil and gas exploration through economic incentives for innovative technology solutions; 6) Study the use of the Texas Economic Development Act since its enactment as HB 1200, 77th Legislature, Regular Session. Determine how the Act may be enhanced to better attract significant capital investments by science and technology industries developing alternative energy sources (Joint Interim Charge with the House Committee on Economic Development); 7) Monitor the agencies and programs under the committee's jurisdiction.

The Committee has completed their hearings. The Energy Resources Committee has adopted and approved all sections of the final report.

Finally, the Committee wishes to express appreciation to the agencies, associations and citizens who contributed their time and effort on behalf of this report.

HOUSE COMMITTEE ON ENERGY RESOURCES

INTERIM STUDY CHARGES

- CHARGE 1: Examine issues related to electrical lines and abandoned equipment on oil and gas leases.
- CHARGE 2: Examine whether the Railroad Commission of Texas should regulate carbon capture.
- CHARGE 3: Discuss further the issue of financial assurance in relation to oil and gas wells, and evaluate the current bonding structure.
- CHARGE 4: Discuss alternative energy sources and how best to incorporate them into our traditional energy sector. Also study the potential benefits of biofuels in Texas, including Texas feedstocks best suited for biofuel production and synergies between that industry and traditional energy sectors. Develop recommendations for facilitating the growth of the biofuel industry in a manner that best positions Texas in the national market.
- CHARGE 5: Research ways to maintain groundwater quality in relation to oil and gas exploration through economic incentives for innovative technology solutions.
- CHARGE 6: Study the use of the Texas Economic Development Act since its enactment as HB 1200, 77th Legislature, Regular Session. Determine how the Act may be enhanced to better attract significant capital investments by science and technology industries developing alternative energy sources. (Joint Interim Charge with the House Committee on Economic Development)
- CHARGE 7: Monitor the agencies and programs under the committee's jurisdiction.

INTERIM CHARGE 1
ELECTRIC LINES AND ABANDONED EQUIPMENT

BACKGROUND

During the 80th Legislative session, it was brought to the Committee's attention that under current law, the Railroad Commission of Texas (the Commission) lacks the statutory authority to address the issue of older oilfield lease contracts being outdated and containing few, if any, provisions relating to safety, environmental harm, or idle equipment. Some leases date back to the 1920s and have been transferred to multiple operators since that time.

According to a Department of State Health Services mortality report, the 2006 wildfires in the Texas Panhandle burned more than 900,000 acres and caused 12 reported human deaths. The two largest of these fires were caused by power lines downed by sustained winds of 46 miles per hour and gusts up to 52 miles per hour. Allegedly, at least one of the downed lines was an oilfield electric line that had not been properly maintained. While the majority of electrical lines are built to generally accepted standards, some oilfield leases throughout this state contain sagging electrical lines connected to crossbars that are dangling on deteriorated poles. These lines represent an extreme hazard to public health and property.

Furthermore, although gathering lines are regulated by federal law, the Commission has no statutory authority to regulate production and flow lines. Production and flow lines beneath roads are often buried at the surface or only a few inches below the road. Graders may inadvertently rupture these lines, leading to human and environmental harm.

Finally, a number of Texas oilfield leases are littered with equipment on well sites that have been idle for years. Under current Commission rules, operators are allowed to effectively leave idle wells and related equipment on a lease indefinitely. Since many of these lease contracts are outdated and did not contemplate these future issues, landowners are left with little opportunity to return their land to its natural state once a well stops producing. This equipment litters the land and can pose a safety threat to humans and livestock.

In an attempt to address these issues, Senator Duncan filed SB 1574 during the 80th Legislative session, and Chairman Hardcastle sponsored the bill in the House. Due to time constraints at the end of session the bill was not able to pass, leaving Texas landowners to continue dealing with these issues. Therefore, the Committee felt that this issue warranted further study during the interim.

INACTIVE WELL STUDY GROUP

As a result of the work that was done on SB 1574 during session, and the interim charge to further study the issues, the oil & gas industry recognized the need to work with the Committee to develop recommendations. Industry representatives formed an informal work group known as the Inactive Well Study Group (IWSG). As of the Committee's hearing on May 20, 2008, the industry members who were participating in the IWSG were as follows:

- Donna Warndof and Adam Haynes representing Texas Independent Producers and Royalty Owners (TIPRO)
- Ben Sebree and Julie Moore representing Texas Oil and Gas Association (TXOGA)

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- Bill Stevens and David Blackmon representing Texas Alliance of Energy Producers (TAEP)
 - Ben Shepperd representing Permian Basin Petroleum Association (PBPA)
 - Wayne Hughes representing Panhandle Producers and Royalty Owners Association (PPROA)
 - Billy Phoenix representing Texas Land and Mineral Owners Association (TLMA)
 - Doug Robison who worked closely on HB 1904 during the 80th Session
 - Kerry Knorpp who worked closely on SB 1574 during the 80th Session.

The IWSG is working to come up with solutions that can be agreed upon by the land and mineral owners and the oil and gas producers, while maintaining the dominance of the mineral estate over the surface estate.

The IWSG has identified the inactive wells in the state as the source of the complaints about surface issues. The IWSG maintains that through addressing the financial assurance issues surrounding inactive wells, you will in effect address many of the surface complaint issues.

The IWSG maintains that certain elements of surface clean up should be required as a condition of renewing a well's inactive status application. While the proposal made to the Committee by the IWSG is not final and continues to be a fluid document, some of the solutions proposed include the following:

- For any application to renew inactive well status, de-energizing of electric lines at the well site would be required.
- At the time legislation is passed, wells that have been inactive for a period of time to be determined, certain requirements would apply immediately for the very next application renewal. Such requirements would include de-energizing of lines as well as removal of tank batteries, pump jacks, and flow lines. This would provide immediate relief to the longest-running problem sites.
- Then moving forward for wells inactive for a period of time to be determined and less than that of the above recommendation, de-energizing of lines and removal of tank batteries would be required.

RECOMMENDATIONS

The Committee would like to commend the Inactive Well Study Group for coming together to work to solve the tough issues surrounding surface owner complaints. The Committee looks forward to continued work with the Inactive Well Study Group to resolve these surface issues. Furthermore, the Committee believes that the final recommendations of the Inactive Well Study Group should provide a good basis for legislation to be filed during the 81st Legislative Session.

The Committee would urge the 81st Legislature to work diligently to pass standards that will provide much needed relief to landowners.

REFERENCES

SB 1574 by Duncan, introduced Bill Analysis. March 29, 2007.

Inactive Well Study Group's testimony and handouts provided to the Committee. May 20, 2008.

**INTERIM CHARGE 2
CARBON CAPTURE REGULATION**

BACKGROUND

Carbon dioxide (CO₂) is the fourth most abundant gas in the earth's atmosphere. Animals exhale CO₂ and plants use photosynthesis to convert it to energy. CO₂ has thousands of commercial uses, such as carbonated drinks and dry ice. CO₂ is formed both naturally and by anthropogenic (man-made) processes. CO₂ is a greenhouse gas, and greenhouse gases keep heat in the atmosphere and sustain life on earth. There is growing concern that the climate is warming and that CO₂ emissions play a role in that warming. According to a recent report by the Intergovernmental Panel on Climate Change, most of the observed increase in globally averaged temperatures since the mid-20th century is very likely due to the observed increase in anthropogenic greenhouse gas concentrations.

According to a report by the National Petroleum Council, worldwide CO₂ emissions from energy use are generally predicted to grow, and rising concerns about climate change may lead to further limits on these emissions. Therefore, it is likely that the world is moving into an era in which carbon emissions will be constrained. Oil and natural gas contribute more than half the current, energy-related CO₂ emissions. In a carbon-constrained world, the use of oil, natural gas, and coal will be affected by policy measures to reduce carbon emissions. It will be necessary, if carbon constraints are imposed, to capture and sequester a large fraction of the CO₂ produced by burning these fossil fuels. The National Petroleum Council further maintains that effective carbon management will be aided by developing legal and regulatory frameworks to enable carbon capture and sequestration (CCS).

Capture of emissions from stationary sources and subsequent storage is called sequestration. Fossil fuels came from the earth, and sequestration is considered to be putting them back in the form of CO₂. Carbon capture and sequestration entails trapping CO₂ at the site where it is generated and storing it for periods sufficiently long (several thousand years) enough to mitigate the effect CO₂ can have on the Earth's climate. The technologies for capturing CO₂ exist and are not critically dependent on new technological breakthroughs. CO₂ sequestration technologies also exist, and in fact the oil industry has extensive experience with pumping liquids into subsurface formations and evaluating the security of these formations for storage. One activity in which CO₂ is pumped into reservoirs currently is enhanced oil recovery (EOR). EOR provides testing for various techniques that are relevant to CCS. Texas has been using CO₂ for enhanced oil recovery for years and the regulation of these practices resides with the Railroad Commission of Texas.

REGULATION BY THE RAILROAD COMMISSION

The charge before the Committee is to determine whether the Railroad Commission of Texas (the Commission) should regulate carbon capture.

Texas Carbon Capture and Storage Association

The Committee heard testimony from the Texas Carbon Capture and Storage Association (TCCSA), represented by their Board President, Stephen Melzer. TCCSA believes that the Commission is the appropriate body to regulate carbon capture and storage because of the following reasons: 1)The Commission is the state agency charged with regulation of most underground activity; 2)The Commission has a long history of oil and gas activities, and injection responsibilities have arguably developed the foundation of the nation's underground regulator regimes and protected the state's interests while fostering the state's economic engine; 3)Most of the functions of CCS are effectively the same as the CO₂ EOR activities they regulate today. TCCSA also believes that the toolbox of the Commission can easily be expanded to include the necessary overlay of functions required for CCS. TCCSA further maintains that, since injection projects for gas storage and oil recovery (both regulated currently by the Commission) and CO₂ storage all have common regulatory requirements, the assignment of CCS functions to another organization would be counterproductive.

The Railroad Commission of Texas

The Committee also heard testimony from the Railroad Commission of Texas (the Commission), represented by Rich Varela, Executive Director. The Commission noted that large volumes of CO₂ from sources like electric power plants, synthetic ammonia plants, petrochemical and other industrial facilities, are generally NOT captured and separated. The general activities of such facilities is currently regulated by the Texas Commission on Environmental Quality (TCEQ). If the Commission were to assume the responsibility for CO₂ capture at these type of facilities, statutory changes would be necessary, and an appropriate memorandum of understanding (MOU) would be necessary to clarify the roles of both the Commission and the TCEQ.

The Commission also stated that CO₂ used in the oil field, primarily for EOR, is already captured and recycled in secondary and tertiary oil recovery projects. For the purposes of CCS, once the CO₂ is captured, it would be transported via pipelines to storage facilities around the state. The Commission already regulates such pipelines and would be the natural place for oversight of this activity.

The Commission currently regulates CO₂ injection into an oil or gas reservoir, and this injection is associated primarily with EOR. The Commission has decades of experience in regulating these wells as well as gas storage in depleted oil and gas reservoirs and hydrocarbon storage in salt caverns. However, injection of CO₂ into a non-oil or gas reservoir is currently regulated by the TCEQ. The Commission states that if the Legislature determined that the Commission should regulate all injection of CO₂ - whether into a reservoir that is productive or non-productive or oil or gas - it would need to amend the statutes to clarify that injection and storage of CO₂ is under the Commission's jurisdiction. The Commission would then need to adopt regulations consistent with the Environmental Protection Agency's (EPA) CO₂ injection well regulations and apply for delegation of this authority. The Commission further noted that this process can sometimes take a few years.

RECOMMENDATIONS

The Committee believes that we will soon be facing a carbon constrained world where state regulation of carbon capture and sequestration will be necessary. While it does seem that the current expertise of the Commission would make it a logical fit for regulation of CCS, the Committee also realizes that some aspects of the CCS process would be regulated by TCEQ under current law. The Committee also understands that it would be less burdensome on the CCS industry if only one agency were given regulatory authority. Therefore, the Committee would recommend that the 81st Legislature further research the issue, and consider designating oversight of the CCS industry to only one regulatory agency.

REFERENCES

Dr. Scott Tinker, Bureau of Economic Geology's testimony and handouts provided to the Committee. March 19, 2008.

Hard Truths. Facing the Hard Truths about Energy, A comprehensive view to 2030 of global oil and natural gas. A report of the National Petroleum Council. July, 2007.

The Railroad Commission of Texas testimony and handouts provided to the Committee. March 19, 2008.

Stephen Melzer, Texas Carbon Capture and Storage Association's testimony and handouts provided to the Committee. March 19, 2008.

INTERIM CHARGE 3
FINANCIAL ASSURANCE AND BONDING

BACKGROUND

During the 80th Legislative Session, Rep. Crownover introduced HB 1904 to address concerns with the financial assurance of inactive and abandoned well sites. While an agreement on the best course of action was not able to be reached during session, the Committee did feel that the issue warranted further study, and therefore requested that the issue be taken up as an interim charge.

There are approximately 110,000 inactive wells in Texas which are legally held and operated by legitimate operators. In most cases they are valuable assets, but to the point that they are not, operators should be held responsible for how they are handled. While the Railroad Commission of Texas (The Commission) has made great strides in plugging and remediating the state's orphaned wells reducing the number from 17,000 to 9,579 in just five years, it would be detrimental to the state if these 110,000 inactive wells were to become orphaned.

INACTIVE WELL STUDY GROUP

As a result of the work that was done on HB 1904 during session, and the interim charge to further study the issues of financial assurance, the oil & gas industry recognized the need to work with the Committee to develop recommendations. Industry representatives formed an informal work group known as the Inactive Well Study Group (IWSG). As of the Committee's hearing on May 20, 2008, the industry members who were participating in the IWSG were as follows:

- Donna Warndorf and Adam Haynes representing Texas Independent Producers and Royalty Owners (TIPRO)
- Ben Sebree and Julie Moore representing Texas Oil and Gas Association (TXOGA)
- Bill Stevens and David Blackmon representing Texas Alliance of Energy Producers (TAEP)
- Ben Shepperd representing Permian Basin Petroleum Association (PBPA)
- Wayne Hughes representing Panhandle Producers and Royalty Owners Association (PPROA)
- Billy Phoenix representing Texas Land and Mineral Owners Association (TLMA)
- Doug Robison who worked closely on HB 1904 during the 80th Session
- Kerry Knorpp who worked closely on SB 1574 during the 80th Session.

The IWSG has proposed a menu-style approach for achieving financial assurance for inactive wells. As opposed to blanket bonding or other past proposals, this approach would incorporate steps to manage risk factors and reduce the total number of wells in the inactive category, as well as the length of time they are allowed to remain in the inactive category. This menu-style approach would allow flexibility for the operator to make a decision that best fits their business model, while reducing risk to the industry as a whole.

The basic choices for operators under this plan would be to either plug the well, prove that the well has future potential, or assure financially that the inactive well will eventually be plugged. The IWSG proposal refers to this as Plug It, Prove It, or Assure It, and would allow operators to choose which category best suits their needs. While the proposal made to the Committee by the IWSG is not final and continues to be a fluid document, some of the options under the Plug It, Prove It, or Assure It proposal are described below.

Plug It

When an operator decides that a well is of no future value, the operator can elect to proceed with plugging operations. If a well loses its integrity and is no longer protective of the environment, it must be plugged. Under this option, an operator would be required to plug at least 10% of his total inactive wells per year.

Prove It

Under this option, an operator must prove that the well has future potential. There are a number of ways that the future utility of a well could be established by an operator including:

- An operator may submit an Abeyance of Plugging (AOP) report for their inactive well that is prepared and certifies future utility by a registered professional engineer, geologist, or geoscientist. The AOP would be good for 5 years after which time it could be replaced by a new AOP.
- An operator affirms that the inactive wells are part of an enhanced oil recovery project and could be utilized in the future by the project.
- An operator may conduct a well integrity test every five years.

Assure It

To provide financial assurance that inactive wells will eventually be plugged, the state currently requires bonds, letters of credit or cash deposits from operators to protect against an operator abandoning or deserting his operations. The current financial instruments do not cover all the plugging costs. Recognizing that the plugging of bay and offshore wells is considerably more costly, the legislature provided supplemental bonding requirements for those wells. The IWSG proposed several other assurance options as follows:

- Risk-based financial assurance that would increase the blanket bonds for operators that have a high percentage of inactive wells with tiers for higher inactive well ratios.
- Supplemental financial assurance for inactive wells that would allow operators to submit a supplemental bond each year with their P-5 renewal equal to a certain dollar amount to be determined per foot for all inactive wells. This would be in addition to the blanket bond and any supplemental bond for bay and offshore wells.
- Private escrow funds owned by the operator with 10% of the cost to plug all inactive wells deposited each year.
- Identified closure funds on the person's most recent balance sheet prepared in accordance with standard 143 requirements of the Financial Accounting Standards Board that are sufficient to cover the cost of properly plugging the inactive wells in accordance with Commission requirements.
- Pay an inactive well fee of \$500 for every inactive well that an operator has.

RECOMMENDATIONS

The Committee would like to commend the Inactive Well Study Group for coming together to work to solve the tough issues surrounding financial assurance, and looks forward to continued work with the Inactive Well Study Group to resolve the issue of financial assurance. Furthermore, the Committee believes that the final recommendations of the Inactive Well Study Group should provide a good basis for legislation to be filed during the 81st Legislative Session.

The Committee would urge the 81st Legislature to work diligently to pass standards that will reduce the financial risk inactive wells place on the state.

REFERENCES

Texas Alliance of Energy Producers' testimony and handouts provided to the Committee. May 20, 2008.

Inactive Well Study Group's testimony and handouts provided to the Committee. May 20, 2008.

INTERIM CHARGE 4
ALTERNATIVE ENERGY SOURCES

BACKGROUND

Texas is the number one consumer of energy in the United States, and as the population is expected to continue to increase, the need for energy will continue to be an important issue for the state to address. While the need for traditional, proven energy sources will likely not decrease, the Committee believes that adding alternative energy sources to the mix will become more vital as our energy needs increase.

SNAPSHOT OF TEXAS' ALTERNATIVE ENERGY LANDSCAPE

The Committee had the opportunity to hear from many different experts in the alternative energy sector during their April 16, 2008, hearing. Below will be a summary of each of the testimonies the Committee heard during this hearing.

Comptroller of Public Accounts, State Energy Conservation Office

The Committee heard testimony from Dub Taylor with the State Energy Conservation Office (SECO) as well as from Tom Curran with the Comptroller of Public Accounts Office.

Dub Taylor - SECO

During the 80th Legislative Session, a rider was added to the Appropriations Bill which instructed SECO to update the Renewable Energy Resource Assessment for the state of Texas which was published in 1995. SECO has been conducting the research to update that report and plans to release it by January 2009. Technology has evolved quite a bit in the last 12 years and that will be covered in the report. The format for the report includes analyzation of the following renewable resources: solar, wind, biomass, hydro energy, and geothermal. The report will also look at end-use energy efficiency, conversion technologies, resource utilization, and the status of markets. SECO is using about 2-3 FTE's to manage a team of outside consultants including the following Texas universities: University of Texas, Texas Tech University, Texas A&M University - College Station, West Texas A&M University, and Southern Methodist University. SECO is also using state agencies such as Texas Parks & Wildlife, the General Land Office, and state meteorologists, as well as other outside consultants.

Tom Curran - Manager Research & Analysis Comptroller's Office

The Committee heard testimony on the Comptroller's Energy Report, which at the time of the hearing was still under development. The report was since released on May 6, 2008, and a copy of the full report can be found at <http://www.window.state.tx.us/specialrpt/energy/>. The Comptroller's Energy Report includes an analysis of all fuel sources both renewable and non-renewable. The study includes research on the existing and potential resources Texas can employ to meet its future demands. The study focuses on energy production, energy consumption, and effect on taxes, as well as economic impact to the state. The report also looks at costs to consumers, both directly (at the pump or through electricity bills) and indirectly (through state subsidies). This report is the first of its kind to analyze subsidies. The Comptroller's Office believes that there is no silver bullet that will fulfill our energy needs, but rather, it will require some mixture of all available resources to meet future demand.

Office of Rural Community Affairs

The Office of Rural Community Affairs (ORCA) has a renewable energy program managed by Travis Brown. The Committee heard testimony from Mr. Brown regarding some of the programs that ORCA is involved in, as are outlined below.

ORCA is the coordinating office for the Rural Alliance for Renewable Energy (RARE). RARE brings together some of the state's leading experts in renewable energy from Texas universities, state and federal government, industry, and the state's agricultural producers.

Mr. Brown also represents ORCA in the Texas 25x'25 Alliance. This is a national effort working toward producing 25 percent of our energy from renewable energy by 2025. The Texas Farm Bureau co-chairs this alliance with ORCA.

The goal of the renewable energy program at ORCA is to ensure that rural Texas takes advantage of the opportunities offered by renewable energy. ORCA helps rural communities throughout Texas identify and develop their renewable energy resources.

Texas Department of Agriculture

The Committee heard testimony from Drew DeBerry, Deputy Commissioner with the Texas Department of Agriculture (TDA). TDA is particularly interested in renewable energy and the economic opportunity it provides to Rural Texas. TDA has two programs to incentivize production using renewable feedstocks, however, neither of those is currently being funded.

The first program is the Fuel Ethanol and Biodiesel incentive program which was funded during the 79th Legislative Session. This program was only operational for five quarters, or a little over a year. During that time, it provided net payments of 16.8 cents per gallon of biofuel up to 18 million gal/producer/year. The program made a total of \$14 million in payments to the biodiesel industry in the five quarters of operation. Production projections increased drastically and the program was estimated to cost over \$100 million for the current biennium. The program failed to receive funding during the 80th session, and therefore has not made any payments past those initial 5 quarters.

The second program was created during the 80th session and is called the Biomass Landfill Diversion Program, however, the program failed to receive funding, so it has not been able to be utilized. If funded during the 81st session, TDA can begin to make payments to farmers, loggers, and diverters who provide qualified biomass to facilities who use biomass to generate electricity. As a part of the legislation that created this program, TDA was instructed to conduct a study with the Texas Forest Service to assess the volume of wood waste in Texas Forest regions that could be used for bioenergy. That study is scheduled to be completed in January, 2009.

The uncertainty of the funding of these programs provides a barrier in these industries. TDA believes we need to encourage capital investment, and facilitate and encourage the markets for these products. TDA proposes a capital investment incentive rather than a production based incentive. They believe this incentive could be part of, or modeled after, the Texas Capital Fund, which is currently administered by TDA. TDA further believes that we need to leverage the

state's status as the 2nd largest agriculture producing state in the nation and grow the feedstocks necessary for bioenergy production. TDA believes we should focus the state's resources on developing production and use of feedstocks that are less competitive with food or animal feed.

Texas A&M University System, Agrilife Research, & Agrilife Extension

The Committee heard testimony about three different programs within the Texas A&M University System, and their testimony is summarized below.

The first panel was comprised of Representative Jimmie Don Aycock, Dr. Allan Jones - Texas Water Resources Institute at Texas A&M University (TWRI), and Steve Clark - ZEROS. Rep. Aycock was in front of the Committee to support a technology he had learned of called the ZEROS. ZEROS stands for zero emission energy recycling oxidization system. The Texas Water Resources Institute has been working with Mr. Steve Clark, who is the founder of ZEROS, INC., to study their technology. The ZEROS is a zero emission, waste to energy system with a capacity to purify large amounts of contaminated water. ZEROS is an oxy fuel system developed, patented, and commercialized in the 1980s and 1990s by Steve Clark. The ZEROS technology was originally developed to clean up oilfield waste without producing any atmospheric emissions including CO₂, particulates, mercury, etc., as well as without any water pollution. The system uses low quality fuels that are not usually considered for traditional incineration including a variety of organic materials such as, coal and lignite, municipal solid waste, wood waste, biomass, waste tires, agriculture waste, brush, and other organic wastes, hazardous waste, as well as manure. The ZEROS produces liquid fuels, such as natural gas, kerosene, diesel, and home heating oil. TWRI initially became involved with the ZEROS technology because of the promise it showed for water purification. The ZEROS can distill contaminated water including salt water as well as waste water. Commercial products produced using the ZEROS technology include; electricity, pure CO₂ that can be sold for enhanced oil recovery, distilled water, hydrogen, nitrogen, and liquid fuels as mentioned above. There are currently commercial projects under consideration in Bell, Brazos, Grimes, Hidalgo, and McLennan counties. Private and public funds have already been identified for these projects.

The second program was presented by Bob Avant who is the Bioenergy Program Director for AgriLife Research and the Texas A&M System. The Bioenergy department worked with the Comptroller's office on their energy report. The Bioenergy department has worked to identify feedstocks that provide high tonnage materials and are centrally located, such as; sorghum, energy cane, forest products (mesquite and cedar in piney woods), sweet sorghum, switch grasses and other grasses, crop residues, oilseed crops, algae for biodiesel, municipal solid waste, animal waste, grain, and food waste. They believe that these are all important Texas resources that can be part of the energy mix. They also believe that there is no one silver bullet, and that depending on what part of state you are in, you will see a different mix of feedstocks. Sustainability of the biofuels industry will be key to the success. The logistics are one of the main areas we should focus on. Hauling distances will be a limiting factor and we will need to locate the fuel production plants near the feedstocks, so what we may see are many more smaller scale plants located throughout state. Dedicated crops will need to be high tonnage crops capable of yielding 15 or more dry tons/acre of feedstocks. Currently, biomass costs can range from \$100/dry ton delivered to a facility to \$50/dry ton. To show perspective, \$60/dry ton of delivered material relates to about \$5/million BTUs. Delivered coal is about \$2.50/million

BTUs. Logistics is another key problem. Funds have been spent on conversion rates, but nothing has been spent on the logistics of how to make this work. So the Bioenergy department has started to look into this. The logistics of producing hundreds of millions of tons per year of lignocellulosic feedstocks is the problem. DOE projections show that that would equate to about 110,000 truck loads per day delivering these feedstocks. Therefore, we will need highly efficient harvest and transport systems. Modeling is important to determine where it is economically viable to locate the fuel plants in sustainable areas. There will need to be a tight footprint meaning high tonnage material in a compact location, and that may call for the use of diverse feedstock, including municipal solid waste, grown crops, etc. Another issue identified by the Bioenergy department is the year-round availability of feedstocks. The fuel plants will not be able to afford to go idle, so there will have to be a diverse mix of feedstocks in order to sustain the plants year-round. In the realm of financing, long-term biomass delivery contracts will be important to obtain financing, and capital availability is critical to get first generation facilities up and running. They also believe that we should focus on viable feedstocks that do not compete with food or animal feed. Also, we should be looking down the road to the generation 2 & 3 fuels that they believe will look much more like gasoline and diesel and will be fungible in the system. They believe that ethanol is a bridging fuel that may get the infrastructure in place, but will not be sustainable long-term. Technologies are being developed at Texas A&M and other universities as well as in the private sector that will take biomass and turn it into biofuels. They believe that ethanol will be in the mix, but there are real opportunities beyond that. They also believe that we need to be conscious to avoid unintended consequences. We will need to focus on the economics of different systems so that investors do not put money in a system that might not be viable. The Bioenergy program received \$2 million per year in exceptional items from the 80th Legislature that funded 14 projects. Those \$2 million in exceptional items also allowed them to leverage \$25 million for 23 other projects.

The final program from Texas A&M which the committee heard from was presented by Dr. Joe Outlaw, with the Agricultural and Food Policy Center (AFPC) at Texas A&M University. The AFPC researched the biodiesel industry on behalf of the Biodiesel Coalition of Texas to look at economic impact of the biodiesel industry (the industry). The industry in Texas got off to a good start. For many years, we were number one in the United States. However, high feedstock costs have been a hold back for the industry in Texas. It is important to note that ethanol and biodiesel are two different processes. Biodiesel has fewer food versus fuel versus feed issues than ethanol does. AFPC released a report on the effects of ethanol on Texas food and feed. While the report states that ethanol has not been a big impact on the beef cattle industry yet, it has the potential to impact that industry. Feedstock prices are the biggest hurdle in the industry in Texas. They are currently in the 50 cent per pound range. Even though the industry capacity was 118 million gallons/year in 2006, we only used half of that in 2007 because of the cost of feedstock which meant a loss of about \$144 million in economic impact for the state had we been able to produce at capacity. By the end of 2008, we are expected to have 536 million gallons/year of capacity on line which means if we are only able to produce at the 59 million gallon level that we produced in 2007, Texas will be running severely under capacity. We buy most of our feedstocks from out of state. We are losing that money to another state and sometimes another country. If we can get feedstocks at reasonable prices in the future, then we could produce at our full capacity of the 536 million gal/year expected to be online at the end of 2008. That economic impact would be very large to the state with an estimated \$2.36 billion of direct economic impact. The AFPC

believes that Jatropha could be a very promising feedstock for biodiesel production, and that it could be grown easily in Texas. It is still being tested, but they believe that it looks promising. They believe that the breakeven price to produce would put it in a range that the biodiesel production industry could take. Jatropha is not a food oil, so it would not compete with cottonseed or canola oil. They are still not sure which crop will be the leader. Another large hurdle they see is what land will be used to produce a feedstock crop. Some of these crops such as Jatropha, are able to be produced from marginal lands that are not currently being produced for any other crop. The economic impact projected for Jatropha in Texas could be as high as \$1.3 billion which would make it the number three agriculture commodity in the State of Texas behind cattle and cotton. However, the establishment costs are high (around \$11 billion), so it would not happen overnight, but be phased in. That economic impact would be staying here in Texas and not leaving. The bottom line message from the AFPC was that the biodiesel industry has the ability to provide a large impact to Texas' economy if there are feedstocks available here in Texas.

Gas Technology Institute

The Committee heard testimony from Dan LeFevers who is the Executive Director for Washington operations for the Gas Technology Institute (GTI). GTI has had a long history of developing energy technology for natural gas and the energy industry. They were instrumental in coal-by-methane development which currently accounts for 15 percent of the natural gas supply in the United States. GTI works to develop new gasification technologies including: syngas from coal and biomass for electricity, combined heat and power, and gas for various chemicals and product production. GTI has offices in Illinois, Texas, Alabama, and Washington DC. GTI believes that Texas has a great opportunity that is currently being overlooked. There is currently a project going on in Stephenville, Texas, where they are taking manure mixed with grease from restaurants and making renewable gas. This gas is being sold and runs through the natural gas pipeline. Once this renewable gas is in the system, it has all types of uses. Renewable gas can be used for anything for which natural gas is used. Texas has one of the best pipeline systems in the world and it is already bought and paid for. GTI believes that you do not need new research and development on renewable gas to make it viable, you just need a level playing field. Nationally, there is an incentive to produce renewable electricity and there is also incentive for the production of renewable biofuels. But, there is currently no incentive for the production of renewable gas. GTI believes that Texas has the opportunity to be the number one producer of renewable gas in the country because of the pipeline infrastructure and available animal waste and biomass resources. Texas can sell that renewable gas throughout the United States which could be a great economic opportunity for the state. Renewable gas used here in the state can help to lower the carbon emissions. GTI wants renewable gas to be eligible for whatever incentives we may pass in the future to provide a level playing field.

Geothermal Industry

The committee heard testimony on the geothermal industry in the state from a panel comprised of Steve Munson with Vulcan Power Company and Richard Erdlac with Energy America Geothermal (EAG).

According to Mr. Erdlac, Texas has geothermal potential for electrical power production in the Gulf Coast, Permian Basin, as well as the Panhandle, and the Trans-Pecos area. Geothermal

energy is important for energy efficiency improvement. Geothermal energy can be used for heating and cooling for businesses, homes, etc. Mr. Erdlac quoted the DOE saying that geothermal energy requires 25-50% less electrical usage than a conventional HVAC system. According to Mr. Erdlac, geothermal energy has a capacity factor of 95% which is important to ensure that there is always electricity available when needed. Mr. Erdlac stated that there is a huge potential for Texas because we can use the oil and gas infrastructure to send power into the grid produced at the wellhead from geothermal energy.

Mr. Munson is the CEO of Vulcan Power. Vulcan is in the geothermal power business. Mr. Munson believes that geothermal power is currently cost competitive with new gas-fired power generation. The geothermal power industry is currently producing enough power for 3 million Americans as an industry in 6 states including California, Nevada, Utah, Idaho, Alaska, and Hawaii. He stated that the University of Texas has estimated that there is potential for upwards of 20,000 MW of geothermal power production in the Texas Gulf Coast. He believes that 400 MW of geothermal power could be on line by the middle of the next decade in the state of Texas.

Biodiesel Industry

The Committee heard testimony on the biodiesel industry in the state of Texas from a panel comprised of: John White of Standard Renewable Energy Group, Jeff Trucksess with Green Earth Fuels, Mike Studer with Greenhunter Energy, Scott Jensen with Geogreen Fuels, and Mike Nasi with the Biodiesel Coalition of Texas (BCOT).

John White is the CEO & Chairman of the Board of Standard Renewable Energy Group (SREG) in Houston. The group has several renewable energy companies. His testimony focused on Galveston Bay Biodiesel. Substantial private capital has already been invested in the renewable industry in Texas in the hopes that Texas will remain in the energy forefront. SREG has invested \$52 million in Galveston for their biodiesel project. SREG is working with inventors, the state, and the state's universities to look at the next generation of feedstocks for biodiesel. They understand the concern of using food source oils as feedstocks for biodiesel. SREG is introducing tallow, and is working on algae and jatropha as feedstocks for the future. They understand that every state that borders Texas has created incentive programs for biodiesel. While Texas has an incentive program under the Texas Department of Agriculture, it is not currently funded, and SREG urges the funding of that program.

Jeff Trucksess of Green Earth Fuels, which is a biodiesel production company in Texas, also provided testimony to the committee. The company believes that the future of alternative fuels and biodiesel can be in Texas. While Texas is not currently a large producer of feedstocks, we have the potential to produce those feedstocks. Green Earth Fuels is a biodiesel production company with a 90 million gallon/year biodiesel production facility on the Houston ship channel. This facility is one of the largest biodiesel production facilities in the country. Green Earth has invested about \$100 million in Texas to date. They believe one of the advantages Texas has is distribution, which is a key challenge to biodiesel and biofuels. The whole country is fueled from the Gulf Coast. Texas has the pipeline system and truck rack system already in place to distribute traditional diesel. And, biodiesel has the potential to run in the diesel pipelines currently in place. This provides a great opportunity for Texas. Green Earth believes that Texas should work in partnership with biodiesel companies to facilitate the growth of feedstocks in

Texas. Montana has already been working in partnership with the state, universities, and the agricultural producers to ensure the growth of energy feedstocks.

Mike Studer is President of Greenhunter Energy located in Grapevine, Texas. Greenhunter was the first publicly traded portfolio-based renewable energy company in the United States. They have assets in the power side, through wind and biomass, and assets in the fuel side in biodiesel. Greenhunter is investing \$75 million in a facility in Houston referred to as a renewable fuels campus. They acquired a small waste oil recycling refinery converting it into a renewable fuels campus to include the largest biodiesel refinery at 105 million gallons/year, a 700,000 barrel terminal, a 200 million pound glycerin refinery, and a 45,000 barrel/month methanol tower to reprocess contaminated methanol. The campus model is on 20 acres, and the model can be taken to many areas. The refinery capacity allows the use of all feedstocks whether vegetable or animal fats because it is a refinery, not a plant. They believe that this would be easily duplicated, and that it provides a good logistical model. They are committed to getting into the business of producing non-food based feedstocks, and they are working world wide on different feedstocks. They do believe that jatropha provides promise as a feedstock.

Scott Jensen is the Vice President of Geo Green Fuel, which has a 3 million gallon/year biodiesel plant in Gonzales, Texas. The plant ran at under half capacity this last year through a blend of feedstocks, but were not able to find enough economically viable feedstocks to justify running at full capacity. Therefore, they have started research in algae through a division called South Texas Algae. They are working on a 400 acre project (300 acres in algae raceways) with a coal plant to produce algae. The coal plant is interested because they can use the CO₂ emitted from the coal plant to inject into the algae raceways to grow the algae. They can also use the hot water from the coal plants to heat the raceways, and cool the water to return it to the coal plant through heat exchangers. Algae is believed to be able to produce between 1,000 to 5,000 gallons/acre of oil. The commercialization is not there yet, but they think algae shows real promise, and they can start within the next year on their project with the coal plant.

Mike Nasi is General Counsel for the Biodiesel Coalition of Texas (BCOT). BCOT believes that if we have a robust feedstock development program in Texas, and produce significant quantities of biodiesel, we can help reduce some of the cost impacts we see when the price per barrel of crude oil and diesel sky rocket. BCOT thinks the biodiesel industry can help the United States become more energy independent. They do not want to replace petroleum diesel, but to try to cut back on the need to use crude petroleum sources for diesel. BCOT believes that feedstocks are the most important thing to focus on because the lack of adequate feedstocks is what is keeping the industry from producing at capacity. Every state in the country has a suite of programs for biodiesel, and there are a lot of ideas happening in other states that are drawing competition away from Texas. Some of these may not work in Texas, but we do need to do something. We have a \$36 billion renewable fuel standard passed down from Congress, and it is not a matter of if these facilities will be built, it is a matter of where. Right now, they are not being built in Texas, and we do not want to miss out on that. We have already seen a cooling effect on the investment in biodiesel in Texas. If we do not get new feedstocks developed, we are just not going to have biodiesel business in Texas like we could. We are positioned to be a leader, but we must get past the feedstock hurdle to realize that potential.

Ethanol Industry

The Committee heard testimony on the ethanol industry in Texas from Omer Sagheer, who is the VP of White Energy, an ethanol production company headquartered in Dallas. White Energy currently operates two 100 million gallons/year ethanol plants in Texas - one located in Hereford and the other in Plainview. Both plants have the capacity to run on corn and sorghum. In 2003, the Texas Legislature created the Fuel Ethanol and Biodiesel Production Incentive Program which gave ethanol producers a credit for each gallon of ethanol they produce in Texas. Because of this, White Energy decided to locate in Texas and invested over \$300 million in new construction for their two facilities. As a result of the incentive program, Texas brought many investments to the state. But, the lack of funding this past session was unfortunate and, as a result, White Energy has not received any funds. Without the continued funding of the incentive program, companies will locate elsewhere. White Energy wants to encourage the legislature to continue the funding of the incentive program in 2009, so that Texas does not lose out on the growth of the renewable fuel industry.

The Committee also heard testimony from Karl Doenges, with Clean Fuel Distribution, which is an ethanol supply and distribution company. They supply every E85 station in Texas, down the Gulf Coast into Florida, and all the way up the Atlantic Coast to New York. They also supply 35 bulk ethanol terminals. They are currently working with cellulosic ethanol plants to create a market so that when these cellulosic plants are producing, there will be a market ready for them. Clean Fuel Distribution is also working to help build a cellulosic ethanol plant in Texas. Mr. Doenges pointed out that cellulosic ethanol plants are different from corn ethanol plants and they have a different market. He stated that corn-based ethanol is designed to supply ethanol in bulk shipments to mandated markets like the mandated E10 markets in Houston and Dallas. He stated that non-mandated E10 and E85 are the critical components to cellulosic markets. He thinks that they will not be able to compete with large bulk shipments of corn-based ethanol coming from the Midwest because cellulosic plants will be smaller and distributed and sold directly to retailers, fleets, and local independent petro distributors. Before the currently planned cellulosic plants are up and running, Clean Fuel Distribution believes that work needs to be done to shore up the cellulosic ethanol markets in Texas to ensure they have the ability to sell their products.

Biomass Industry

The Committee heard testimony on the biomass industry in Texas from a panel comprised of John Robins with Mesquite Fuels and Anthony Callendrello with Nacogdoches Power.

John Robins is the President of Mesquite Fuels and Agriculture who operates in Central Texas. Mr. Robins first provided the Committee with an overview of the biomass-to-electricity industry in Texas. According to Mr. Robins, biomass-to-electricity projects located throughout the state are as follows: East Texas is using forest waste and residue; South Texas is using cane residue and agricultural waste; Central and West Texas are using species in eradication such as mesquite or juniper, and cedar, as well as agricultural waste; and Ft. Worth and Austin are using urban wood waste. Biomass-to-electricity uses waste or unused materials- they do not use food or food properties to generate fuel. Biomass plants are able to operate 24 hours a day/365 days a year, and they are sustainable, meaning they have the opportunity to be base load. There are currently either planned, permitted, or under construction, 150 MW in East Texas, 50 MW in South Texas, 100 MW in West and Central Texas, and 50 MW in suburban/urban Texas. These

plants should be operational by December 31, 2010, providing Texas with 350 MW of power. The investment for these plants is approximately \$3M/installed MW, translating to about \$1B in total investment. Mesquite Fuels estimates that they create 4.5 jobs/ MW installed, with one of those jobs at the plant and about three to four times that many jobs created in the harvesting and gathering of fuel. Mesquite Fuels is building their first plant in Jones County using 650,000 acres of timber leases which is roughly the size of the state of Rhode Island. These leases include Mesquite, Juniper, and Cedar, and the leases will provide a 20-year supply for 75 MW of power. Mesquite Fuels believes that we need more than just wind, and would like to see a portion of the renewable credits in Texas for non-wind.

Anthony Callendrello is the VP of Nacogdoches Power. They are currently beginning construction on a 100 MW wood-fired power plant in Nacogdoches County. They are developing sister plants in Northern Florida, and believe there are other opportunities throughout the Southeast. They believe that there is opportunity for Texas in biomass power. According to Mr. Callendrello, in 2006, there were no biomass power plants operating in Texas while the rest of the country recognized \$17 billion in revenues from biomass power plants and 66,000 direct jobs, and 152,000 indirect jobs. Texas did not benefit from that. According to Mr. Callendrello, biomass plants can lower the cost of power for consumers because they are base load. Mr. Callendrello also stated that an advantage of biomass power is the use of waste which does not compete with quality wood. He also stated that biomass power production is not only carbon neutral, but it reduces carbon. He believes another advantage of biomass power is the disposal of waste after storms such as Hurricane Rita.

The Committee also heard testimony regarding the use of woody biomass for fuel and its possible negative effects on the forest products industry from Tony Bennett with Temple Inland, and from Todd Morgan with the Texas Forest Industries Council. Mr. Bennett stated that the forest industry has been generating power using woody biomass for almost a century- first in the form of steam in the early days, and then in the form of electricity for the last half of the century. Mr. Bennett stated that Temple Inland produces 70% of its own electricity using this woody biomass at their Orange paper mill. Temple Inland is in favor of renewable fuels, but is afraid of unintended consequences the use of woody biomass could have on the forest products industry. Mr. Bennett stated that, the two top costs of a forest products manufacturing plant are energy and wood fiber costs (used both to produce energy and as a raw material). They are concerned that if the state passes woody biomass incentive programs, this could be a problem for the forest products manufacturing industry, that could put them out of business. Todd Morgan stated that the Texas Forest Industries Council has similar concerns to those expressed by Mr. Bennett. He stated that the forest industry uses woody biomass every day to generate their own electricity to be able to manufacture their forest products. They fear that using woody biomass for fuel could disrupt this practice, and pose a real problem for the forest products manufacturing industry.

Wind Industry

The Committee heard testimony on the wind industry in Texas from Paul Sadler, the Executive Director for the Wind Coalition. He believes that the wind industry is a great success story in the state of Texas.

The Wind Coalition (the Coalition), is made up of seven states including: Texas, Oklahoma, Kansas, Arkansas, Missouri, Louisiana, and New Mexico. The Coalition believes that although Texas leads the nation in wind power, the story is not over. They believe that there are three essential issues with which every new energy source has to deal: reliability, capacity, and transmission. They believe that transmission is the most important issue for Texas to deal with right now, and that we must build our transmission lines out into West Texas. The Coalition believes that Texas has done a great job of creating opportunity for growth, but we need to keep going.

Waste Heat Industry

The Committee heard testimony on the waste heat industry from Loy Sneary, the CEO of Gulf Coast Green Energy (GCGE).

Mr. Sneary stated that worldwide there is estimated to be at least 9 Million MW of waste heat energy that could be captured and used to produce energy. That amount translates into 18,000 - 500MW coal-fired power plants. Mr. Sneary stated that waste heat is bigger than oil, coal, natural gas, and nuclear power all combined, because 50-60% of all manufacturing in the world is in the form of waste heat. Waste heat is a zero pollution, zero emission energy source and it is free. The fuel to create it has already been paid for and already consumed, and the heat is being released into the atmosphere. According to Mr. Sneary, if we could recover 5% of the available waste heat, it would generate 380,000 MW of power which translates into about \$340-350 billion per year at rate of 8-9 cents/kw hour. That would be enough energy to support 2,300 - \$150 million/yr companies. GCGE would like to see waste heat included in the renewable energy credits for non-wind. GCGE is a new start-up company located in Matagorda County, and they are the exclusive distributors of a technology licensed by ElectraTherm out of Nevada. Their technology produces electricity from heat sources such as distributed generation (cogen plants/ diesel generators), coal-fired plants where they have waste heat that can be captured to produce additional MWs of power, and hydrothermal and geothermal sources. Mr. Sneary stated that 1.5 million tons of coal is burned in a 500MW coal-fired plant every year. GCGE's technology can go into those coal-fired plants and utilize the waste heat to generate another 10% electricity with zero emissions and zero additional fuel. GCGE believes this is making something from nothing. The fuel has already been spent, and they can utilize the waste heat sources in these coal-fired plants to generate the electricity. GCGE's technology does not clean up the air, but it in effect, reduces the overall emissions of the plant by generating the additional power at zero emissions thereby spreading the emissions of the plant over a larger base of power. GCGE's equipment has a return on investment of about 3 years. GCGE believes they are a green energy because they are making something from nothing with zero emissions. SMU is currently testing the first 50 KW unit in the United States, and GCGE is proud that the state of Texas is the place where the first piece of equipment is being utilized.

Solar Industry

The Committee heard testimony on the solar industry in Texas from a panel comprised of Robert Zerner of Sanyo Energy, Richard Gruber of First Solar, and John Langdon of Heliovolt.

Robert Zerner is the Market Development Specialist for Sanyo Energy Corporation which is a subsidiary of Sanyo Electric Company. They are a top 5 manufacturer of solar panels and have

been in the business of solar since 1975. In 2006, Sanyo moved their headquarters from San Diego, CA, to Frisco, TX. Sanyo believes that Texas has a great opportunity in solar. They believe that by 2010, solar production capacity will increase six fold. Sanyo believes that in a short time, and with the proper stimulus, Texas can catch up to California and New Jersey who lead the nation in solar. Texas must provide a multi-year, large scale commitment that removes current market barriers. Sanyo believes that Texas must have a cost effective policy similar to what other states are doing that include the following principals: 1) Texas must jump-start demand by reducing installed system costs, and encourage a broad portfolio of applications from small residential to large commercial; 2) Texas must have adequate net metering, and interconnection standards must be set; 3) Utilities must provide a broad range of rates that incentivize efficiency and peak load reductions allowing customers to choose from a solar friendly rate; and they believe we must eliminate homeowner association bans against solar installation. The solar industry in the United States was \$2 billion last year and it is projected to grow by 40% over the next year, and Texas is missing out.

Richard Gruber is the Vice President of Project Development for First Solar. First Solar was founded in 1999, in Phoenix, AZ. They are one of the largest photovoltaic (PV) solar manufacturers in the world, and are also the largest, and lowest-cost, thin-film PV manufacturers in the world. According to Mr. Gruber, solar technology is real, ready, and proven today. First Solar's primary mission is to reduce the cost of manufacturing of PV modules. They are also working to drive the cost down for the components that constitute a solar power plant. They are focused on building utility-scale distributed central plants which are solar power plants of 20 MW or larger. They believe these solar plants are the fastest way to drive the cost of power down in solar and to make it cost competitive. First Solar believes that there are many benefits of low cost utility-scale solar plants, such as the following: 1) A solar power plant provides a stable cost with no fuel cost risks and very little operating cost so they are able to contract for fixed price contracts for 25 years; 2) They believe this creates a risk management tool for utilities, companies, and customers because they eliminate the risk associated with fuel cost volatility, the cost of carbon emission standards in the future, and the availability and cost of water for power generation; and 3) They believe the value of output of solar is very high- they operate when power is needed the most and when it costs the most. First Solar believes that we are reaching a tipping point where solar PV will have a cost point enabling it to become mainstream in the United States over the next few years. First Solar hopes that Texas will work to remove the market barriers so that Texas can become a leading solar-producing state.

John Langdon is with Heliovolta, which is an Austin-based, thin film solar PV manufacturer. Heliovolta believes that when fully deployed on homes and buildings, solar could generate about 1/3 of the electricity used in the United States, with no fuels, no emissions, no water requirements, and no transmission lines, if it is deployed where the power is used. They believe this is a way to reduce our dependence on foreign fuel sources by reducing demand overall for electricity. Heliovolta believes that as developing countries like China and India bid up the price of fossil fuels, eventually solar electricity will be a lower priced option. They would like to make that happen sooner, by removing road blocks to deployments of solar systems. They believe that Texas should adopt a set of uniform standards across the state for zoning, building codes, and installation. According to Mr. Langdon, Germany is currently the worldwide leader in solar, and they have 1/2 to 1/3 the solar resources of Texas. Heliovolta believes that Texas

could help the United States take back the lead in solar from Germany.

Hydro Power Industry

The Committee heard testimony on the hydro power industry in Texas from Brent Ballard with Gulfstream Technologies.

Their technology is a hydro turbine technology. They will harvest electricity from one-directional currents such as rivers, streams, waste treatment facilities, refineries, and below existing hydro dams. The technology is designed to operate in both fresh and brackish water with a lifecycle of 25 years. Their source provides a constant supply of electricity and would operate an average of 22-23 hours per day over a year. It would offset base load needs by flowing the power produced back into existing power plants. They have finished R&D and are ready to provide turnkey operations with their technology. On average, they can generate from 250 kw/hr up to 2-3 MW/hr on an ongoing basis. Mr. Ballard would like the hydro power industry to be kept in mind when developing any renewable energy credits.

Others

The Committee also heard testimony from several other individuals who did not fit into one of the categories above, and their testimony is summarized below.

Bob Manning is the Director of Engineering for the HEB grocery chain. HEB employs 65,000 people, and their annual utility budget exceeds \$125 million per year. HEB believes every dollar they can save on energy can help them run a healthy company and keep prices as low as possible for their customers. Mr. Manning stated that retail electric competition in Texas has been a painful experience for HEB. He said that HEB has spent more than \$50 million for competitive power above what they paid for regulated power. HEB believes that the state's power mix needs to include more renewable energy. HEB believes that there need to be incentives for renewable energy consumers and developers to help bridge the startup gaps for the various renewable energy industries in Texas.

Cyrus Reed of the Lonestar Chapter of the Sierra Club testified before the committee giving their perspective on biofuels and renewable electricity. Mr. Reed stated that the Sierra Club shares some of the concerns of the fuel-versus-food debate. They believe that algae looks very promising and could be a win-win by providing biodiesel, and at the same time, cleaning up the carbon emissions from some of our existing coal plants. Mr. Reed picked out some of the key points from the Sierra Club's 12-point plan for meeting our electricity needs. He stated that we should raise the total Renewable Portfolio Standard (RPS) and that we should also create a non-wind tier within the RPS. He believes the state's current energy efficiency program is good, but it could be raised to 50% and allow the market to decide how to get there. He also believes that economic development tools such as putting more money into the Emerging Technology Fund for renewable energy could be a way to get where we want to be. Mr. Reed stated that we should look at converting our state fleet of vehicles to a more green fleet by mandating that state agencies buy the most cost effective and fuel efficient vehicles available. The Sierra Club agrees that we do not need to pick the winners and losers, but rather, set goals and allow the markets to determine what the mix will be.

Conclusion

The Committee heard from many varied industries on many exciting projects taking place in Texas in the alternative energy sector. The Committee felt it was important to include a summary of each of the testimonies that were heard. The summaries above are the opinions of each individual who testified and do not represent either support or disapproval of the Committee for any industry.

RECOMMENDATIONS

The Committee believes that it is important for the state of Texas to develop and maintain a diverse statewide energy plan that includes all types of traditional and alternative energy sources. The Committee does not believe that the Legislature should pick the winners or losers, but rather, ensure that the regulatory framework of the state is not providing barriers to entry to any type of energy production.

REFERENCES

Relevant testimony and handouts provided to the Committee during its April 16, 2008, hearing.

INTERIM CHARGE 5
GROUNDWATER QUALITY SOLUTIONS

BACKGROUND

Water is an increasingly high demand, scarce resource. Increasing water use due to growing population, drought, and natural gas production, have heightened concerns in North-Central Texas about the viability of local groundwater resources.

The Texas Water Development Board (TWDB) commissioned a study to analyze water use in the following areas; Bosque, Comanche, Cooke, Coryell, Dallas, Denton, Ellis, Erath, Hamilton, Hill, Hood, Jack, Johnson, McLennan, Montague, Palo Pinto, Parker, Somervell, Tarrant, and Wise Counties, which overlie both the Trinity and Woodbine aquifers, the Barnett Shale, and include urbanized areas near Fort Worth.

Throughout the study area, water is used for a variety of purposes, including municipal, industrial, electric power generation, agricultural, and mining demands. Municipal use is the greatest current use, representing 77 percent of the total 1.3 million acre-feet of water used in the area in 2000. Most of the water supply for the region, 89 percent, is provided by surface water sources, while groundwater is utilized for the remainder of the total demand. Natural gas wells in the Barnett Shale make up a new demand for water in the area. Water is used in the Barnett Shale during the drilling process and to hydraulically fracture the formation around the gas well, in order to retrieve the gas from the shale formation. Well types vary, but the water used to frac these gas wells ranges from 4 to 11 acre feet of water. This is a temporary water demand, usually spanning an interval of about one month per gas well. Total water demand for gas well development in the Barnett Shale was estimated to be 7,200 acre-feet in 2005. About 60 percent of this water came from groundwater in the Trinity and Woodbine aquifers. The amount of groundwater use associated with gas well development in the Barnett Shale accounts for about 3 percent of the total groundwater use in the study area.

According to the TWDB report, current regional water plans estimate that total water use in the study area will increase from about 1.3 million acre-feet per year in 2000 to 2.1 million acre-feet per year in 2025. Most of this escalation is projected to be due to increased municipal use. The TWDB study calculated both low and high groundwater demand estimates based on a number of technical and economic factors including: projected population growth, rates of conversion to alternative supplies, and other factors, including natural gas price, that control Barnett Shale drilling activities and associated groundwater production. TWDB's report estimated the low groundwater demand total use in the study area could decrease from about 142,000 acre-feet in 2000 to about 140,000 acre-feet in 2025. The report estimates the high groundwater demand total to increase by 30 percent from about 142,000 acre-feet in 2000 to about 190,000 acre-feet in 2025. The study further estimates total water demand for the development of natural gas wells in the Barnett Shale to rise to about 10,000 to 25,000 acre-feet per year by 2025. This would represent a growth in use for natural gas wells from about 3 percent of total groundwater use today, to between 7-13 percent of total groundwater use by 2025.

Water used to frac a natural gas well becomes contaminated with salt, crude oil, drilling chemicals, and other pollutants. This water must be properly disposed of, and is currently transported to nearby injection well sites. According to testimony provided to the Committee by General Electric (GE), approximately 5 billion gallons of water is disposed of in injection wells

every year, that equates to 400 million gallons per month. Water use is not the only downside to this disposal process. Communities in the disposal well region complain that the volume of trucks driving on their roads to carry this contaminated water to a disposal site causes for higher than normal traffic, and causes their roads to wear out far before they would have otherwise. This ultimately costs the communities money to repair the roads.

SOLUTIONS

The Committee heard testimony from General Electric (GE) regarding a technology they offer which can remove the salt to recover fresh water from the currently contaminated and disposed of water. GE is currently working with STW resources and has a complete portfolio of solutions for any of the waters being disposed of in the Barnett Shale. GE's technology allows them to receive water that would currently be disposed of in a disposal well and distill it to yield about 70 percent pure distillate (distilled water) with the remaining 30 percent being a concentrated brine that would continue to be disposed of in a disposal well. This would mean that of the current 5 billion gallons of water that is disposed of every year in the Barnett Shale, 3.5 billion gallons of that water could be reused and only 1.5 Billion gallons would be disposed of using GE's technology.

The distilled water that is recaptured from the waste water could be used in a number of ways. It could be taken back to the field to be reused for well fracing. It also could be injected into the aquifer to replenish the water supply, or it could be discharged into a river. The reduction of water being disposed of would also help to cut down on the truck traffic.

RECOMMENDATIONS

The Committee believes that water conservation is very important and will only continue to increase in importance. Everyone needs to do their part to ensure that the water resources of this state are preserved. The Committee heard testimony about one technology that may be helpful in reducing the amount of water disposed of in oil and gas production. However, the Committee realizes that there may be other technologies available to oil and gas producers, and the Committee does not want to give any preferential treatment to any company or technology. The Committee would encourage oil and gas producers to seek out technologies that can help recycle and reuse the water needed for oil and gas production.

REFERENCES

Northern Trinity/Woodbine Aquifer, Groundwater Availability Model, Assessment of Groundwater Use in the Northern Trinity Aquifer Due to Urban Growth and Barnett Shale Development, Texas Water Development Board Contract Number: 0604830613.

General Electric (GE) testimony and handouts provided to the Committee. March 19, 2008.

INTERIM CHARGE 6
ECONOMIC DEVELOPMENT ACT (JOINT WITH ECONOMIC DEVELOPMENT)

BACKGROUND

The Committee was assigned a joint charge with the Committee on Economic Development to study how HB 1200, enacted during the 77th Legislative Session and authored by then Representative Brimer, could be enhanced to better attract significant capital investments by science and technology industries developing alternative energy sources.

Prior to the 77th Legislature, the property tax system in Texas may have placed a disproportionate burden on capital-intensive industries compared to other entities. This burden provided a significant financial disincentive to businesses who desired to invest large amounts of money in Texas, exacerbated by the fact that other states have restructured their tax laws in an effort to attract projects and high-paying jobs. HB 1200, also known as the Texas Economic Development Act, was designed to level the tax burden on capital-intensive companies to encourage large-scale capital investments in the state to create new jobs, and to enable local government officials to compete with the economic incentives offered by other states. HB 1200 created a local option economic development tool that allows the state to compete for jobs and large projects.

HB 1200 allowed school districts to negotiate limitations on the appraised value of property for maintenance and operations property taxation for qualifying corporations or limited-liability companies that would use the property for manufacturing or research and development. Qualifying investments were limited to the manufacturing, research and development, and renewable energy electric generation industries.

During the 80th Legislative Session, HB 1470, by Representative Eissler, was passed which extended the Texas Economic Development Act sunset date to December 31, 2011.

RECOMMENDATIONS

It is the opinion of the Committees' that alternative energy projects are needed to help meet the needs of this state. The Committees further believe that the Texas Economic Development Act, as it stands today, can be an important tool for such projects, and should be taken advantage of when possible.

REFERENCES

House Research Organization bill analysis of HB 1200. May 2, 2001.

Bill Analysis, HB 1200, 77th Legislative Session, Enrolled version. July 19, 2001.

Bill Analysis, HB 1470, 80th Legislative Session, Senate Committee Report version. May 18, 2007.

INTERIM CHARGE 7
AGENCY MONITORING

THE RAILROAD COMMISSION OF TEXAS

During the Committee's hearing on March 19, 2008, the Railroad Commission of Texas (the Commission) provided the Committee with an update of their activities since the 80th session ended in May, 2007. The Commission has been very active since session, and an overview of their activities is provided below.

Oil & Gas Division

Oil and gas exploration and production activity in Texas is as high as it's been in the last twenty years. Currently, there are 880 rigs operating around the state. In January of this year, the Commission received applications for a total of 2649 permits. Of those, 2278 were for new drilling. Due to high oil and gas prices, the Commission does not foresee the number of permit applications to decrease anytime soon. Currently, it takes the Commission 7 business days to process expedited permits, and 40 days to process standard permits. Given the current staffing level, the Commission does not see this time line for permit processing changing anytime soon.

The number of orphaned wells has been reduced from 17,000 to 9,579 over the last five years. Field personnel involved in plugging and site remediation currently log approximately 3.7 million driving miles per year. With fuel costs continuing to rise, the Commission expects to exceed \$1 million in fuel expense this year.

Gas Services Division

During the 80th Legislative Session, two bills were passed with direct impact to the Gas Services Division. These two bills were HB 1930 by Representative Keffer, and HB 3273 by Representative Crownover. The rules to implement the provisions of these bills were adopted by the Commission at the beginning of March, 2008.

The Gas Services Division (Division) has streamlined and improved their information access capabilities to enhance the ability of outside parties to access and research crucial pipeline permit information and to retrieve pipeline permit number, operator name, and the county where a pipeline is located. They have also converted their historical docketed information, utility rate proceedings, and the annual gas utility financial reports, to electronic format. Furthermore, the Division has added functionality to provide the ability for industry to pay for both new and renewal of LP-Gas, CNG, and LNG licenses online via credit card.

Safety Division

The Commission has also implemented some changes in the Safety Division (Division) as follows. In pipeline safety, the division created an online data entry system for pipeline operators to file reports required under the Pipeline Safety Rules. This entry system includes data for plastic pipe inventory and incident reporting, pipeline proximity to schools, and integrity assessment progress reports.

The Division also created an online third-party damage reporting system to allow excavators, pipeline operators, and the general public to report damages to pipeline facilities and report any violations of the damage prevention regulations. Since the system came online in September, 2007, there have been over 6,000 reports of damages.

The division initiated two pipeline safety-related rulemakings - one to require reporting of all repaired leaks by pipeline operators, and the other, to increase the leak survey frequency of pipelines based upon associated risks and to require time frames for pipeline repairs.

Surface Mining

Lignite mining activity in Texas remains steady with 21 current permits. Uranium exploration has increased dramatically in the last two years. Uranium exploration permits have increased from one active permit about two years ago to 16 active permits, and 4 applications for new permits as of March, 2008.

As a result of HB 3837 by Representative Gonzalez Toureilles, the Surface Mining and Reclamation Division added two new staff members to provide regulatory oversight for the uranium exploration program. These positions were filled at the beginning of Fiscal Year 2008, and rulemaking is currently under way to incorporate the changes resulting from this legislation.

RECOMMENDATIONS

The Committee continues to work closely with the Railroad Commission of Texas. The Committee believes that the Legislature needs to continue to ensure that the Railroad Commission is adequately funded for safety and permitting programs. Texas is the highest energy producing state in the nation, and we need to continue to be a leader in safety standards. It is the Committee's opinion that the Commission is operating at its expected level of performance. Furthermore, the Committee would encourage the Commission to keep up the good work as they continue to serve the people of the State of Texas.

REFERENCES

The Railroad Commission of Texas's testimony and handouts provided to the committee. March 19, 2008.