



**Testimony of Steven M. Wiese
President, Board of Directors
Texas Renewable Energy Industries Association (TREIA)
to the Senate Committee on Business and Commerce**

Testimony Related to Interim Charge #2.

Study options for reducing demand for electricity, including innovative pricing options relating to the use of smart meters, programmable thermostats, and other demand side management and behavioral response strategies. Review current consumer education programs to reduce demand, decrease energy prices, and improve air quality. Consider benefits and costs of alternative energy sources such as geothermal and solar, and current incentives for electric and plug-in hybrid electric vehicles. The study should include recommendations on improving consumer knowledge and usage of these strategies in lowering overall electric usage, promoting energy efficiency, and improving the reliability of the ERCOT grid.

TREIA appreciates the opportunity to provide testimony related to the benefits and costs of alternative energy sources in Texas.

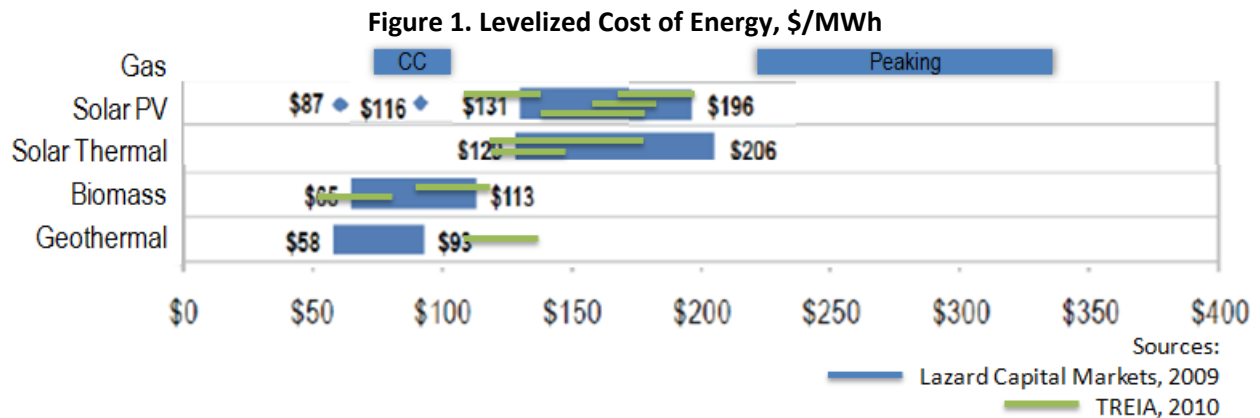
The Texas Renewable Energy Industries Association (TREIA) is a trade association with over 600 members representing over 350 companies, organizations and institutions involved in all aspects of the renewable energy industry in Texas.

TREIA's testimony is provided by Steven M. Wiese, founder and Principal of Clean Energy Associates, LLC, a consultancy which provides businesses, utilities, regulatory and other government agencies, consumers and advocacy organizations with expert knowledge of technical and policy issues surrounding distributed renewable generation. Mr. Wiese currently serves as President of TREIA's Board of Directors.

Our testimony focuses on the costs and benefits of renewable energy in Texas.

Renewable Energy Costs

The cost ranges shown in blue in Figure 1 below are derived from Lazard Capital Markets in 2009, with corroborating 2010 data from TREIA members overlaid in green. TREIA's cost data reflects market contract prices for electricity, i.e., actual bid and/or executed power purchase agreement negotiated prices net of applicable federal and/or state subsidies. The data demonstrate that deployment of solar, geothermal and biomass technologies effectively can reduce wholesale electricity costs, especially when they displace peaking resources on the system.



The Cost of Resource Variability

The innate variability of some renewable energy resources is typically considered as a cost associated with utilization of these resources. It is important to note that this variability is not present in all renewable resources, and that to a large extent the competitive market already effectively devalues energy derived from variable resources appropriately.

Much of the state's biomass and water resources are created seasonally, but their resource variability is not problematic since they can largely be stored for use when needed. Wind and solar resources are variable over short time periods and generally cannot be economically stored, so their variability results in lower market values for energy and poses unique challenges for integrating them into the electricity system at a large scale.

The costs of improving grid operations to account for new generation types (such as variable resources) historically have been uplifted to all market participants. However, improved forecasting, variable resource diversification, and other strategies such as demand response and storage can alleviate the effects and costs associated with resource variability.

It should also be noted that the innate variability of some renewable energy resources is similar to, though much smaller than, the variability of system loads, as well as to the innate inflexibility of some other energy resources.

Renewable Energy Benefits

Reduced Energy Costs

Because the operating/fuel costs of some renewable energy generators are small relative to traditional generation, renewable energy resources can compete economically in Texas' balancing energy market and offset more expensive fossil resources. This reduces costs for all ratepayers.

For example, the Public Utility Commission of Texas in 2009 observed that "Prices are ... lower ERCOT-wide when there are large amounts of wind energy being produced," and concluded that "Wind generation has had the impact of reducing wholesale and retail prices of electricity." The report quantified this savings in the balancing energy market at \$2.38 per MW for each additional 1,000 MW of wind that was produced."¹

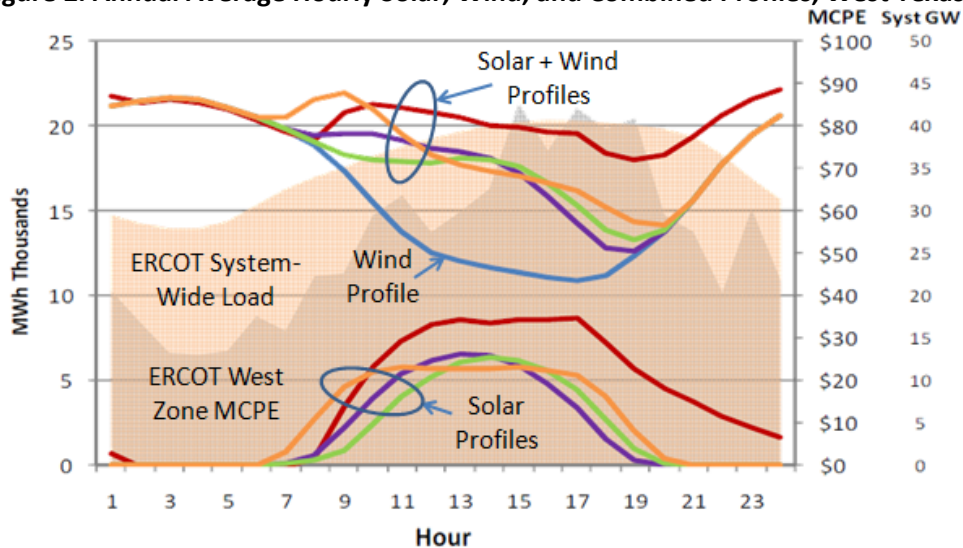
A similar level of savings could be achieved by solar and geothermal generation resources, which, like wind, have no fuel costs.

Benefits of Portfolio Diversification

TREIA supports diversification of Texas' renewable energy resources. Like any investment portfolio, Texas' energy supply portfolio can benefit from having a diverse mix of available resources. Diversification can decrease volatility and enable hedging of resources against each other, smoothing the impact of rapid changes in resource availability and costs on both system operators and consumers. Diversification may be considered in several ways:

- **Fuel Resource Diversification.** Renewable energy resources can complement traditional generation as well as one another. As shown in the chart below,

Figure 2. Annual Average Hourly Solar, Wind, and Combined Profiles, West Texas

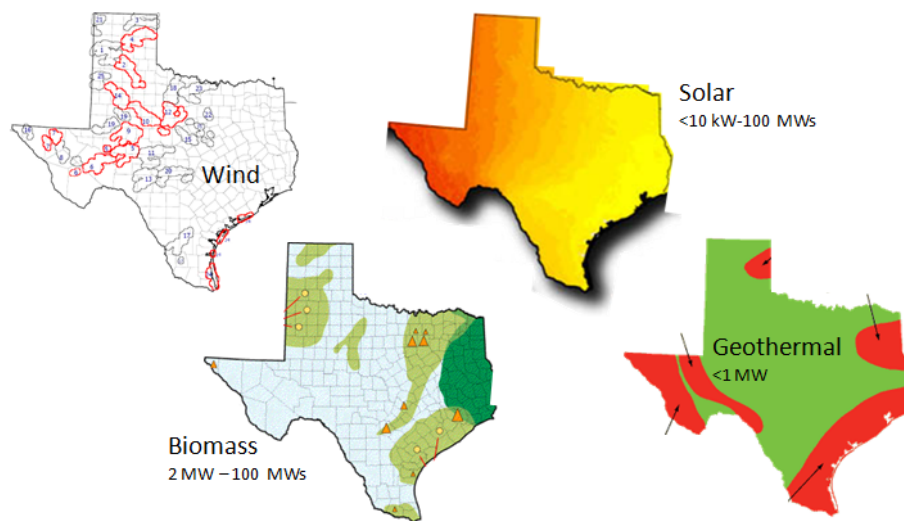


Solar profiles include 3 PV configurations and 1 solar thermal configuration with 6 hours of onsite storage. Source: *Opportunities for Solar Development on Wind-Constrained Transmission Systems*, CEA for Austin Energy, 2009.

¹ Public Utility Commission of Texas, *Scope of Competition in Electric Markets in Texas*, January 2009 (http://www.puc.state.tx.us/electric/reports/scope/2009/2009scope_elec.pdf).

- **Regional Diversification.** Texas’ renewable energy resources are present throughout the state, enabling these resources to contribute to alleviation of congestion problems in all regions. The regional diversity of renewable resources also enables all regions to benefit economically from investments in new generating resources.
- **Scale Diversification.** Texas’ renewable energy development to date has consisted almost entirely of large-scale 1-2 MW wind turbines. Additional opportunities to develop distributed wind resources, grid-scale and distributed solar resources, as well as biomass and geothermal resources, would result in generator scale diversification, from facilities as small as 1 kW to as large as hundreds of MW.

Figure 3. Regional and Scale Diversity of Renewable Energy Resources



Benefits of Distributed Renewable Generation (DRG)

Examples of distributed renewable generation (DRG) include rooftop solar water heaters and solar electric systems, small wind energy generating systems, and ground-source heat pumping systems. Most distributed generation systems produce enough energy to meet a portion of a home’s or business’ energy needs, reducing the amount of electricity purchased from the utility. By producing energy at the point of use, DRG reduces transmission congestion and losses, and provides other unique values in the Texas energy market.

A study by the National Renewable Energy Laboratories identified 19 key values of distributed generation, including values associated with energy generation, available capacity, transmission and distribution cost deferrals, reduction in system losses, reactive power, improved system resiliency, increased reliability, electricity price protection, and pollutant and greenhouse gas emission reductions.²

² National Renewable Energy Laboratories, PV Value Analysis, J.L. Contreras, L. Frantzis, S. Blazewicz, D. Pinault, and H. Sawyer, Navigant Consulting, NREL SR-581-42303, February 2008.

DRG also typically leverages voluntary direct investments by electricity consumers to yield system-wide benefits. These direct investments reduce the investments paid by all market participants for utility-scale projects while producing similar, and in some cases enhanced, benefits.

Since early 2009, seven of Texas' nine investor-owned utilities have established pilot solar PV incentive programs. The programs opened in early and mid-2009 with incentive levels around \$2.50/watt. Rebate levels in some programs have been reduced by 10-30 percent within 18 months of opening (to \$1.75-\$2.25/watt).

These programs have proven enormously popular among both consumers and installers. Some programs have seen all available incentive funds claimed within minutes of opening, and nearly all 2010 programs are currently closed to new applicants.

The programs are largely responsible for Texas' vast increase in the number of nationally-certified PV installers – in 2009, Texas was second only to California in both the number of applicants and individuals who earned the NABCEP PV Installer certification. TREIA has worked collaboratively with its industry membership, the utility programs, local inspection officials, and the Texas Department of Licensing and Regulation to provide clarity around applicable electrical licensing requirements and to ensure that sales and installations are compliant with those requirements.

External Benefits

External benefits are those that accrue outside the electric market itself. They include benefits both to local economies as well as to local natural environments.

Benefits to Local Economies

As has been noted in numerous studies both nationally and regionally, the development of renewable energy generation can lead to significant increases in Gross State Product, tax base and employment opportunities. These effects occur most often in rural areas, leading to strong economic development in communities that have been suffering from loss of jobs, revenue and population for decades.

Perhaps the best example of this impact is the case study of Nolan County, which saw total taxable property values increase fivefold in 10 years, from \$500 million in 1999 to \$2.4 billion in 2008, as a direct result of renewable energy development. As the epicenter of wind energy development in Texas, Nolan County has seen \$24 million in new school construction, almost \$18 million in annual landowner royalties and an 18% increase in local jobs.³

Development of other renewable energy technologies in Texas has lagged far behind wind energy, and as a result actual data is not available. However a number of studies have indicated the development of solar and other renewable energy in Texas will yield economic benefits possibly exceeding those of wind development. Most recently, a study from Billy Hamilton Consulting focused on economic development from renewable energy in Texas. While much of the focus was on the robust job growth that can be achieved through the right renewable energy policies, the study also estimates impact in terms of tax revenue and Gross State Product (GSP):

"A modest investment in wind and solar energy would create 6,000 jobs per year from 2010 to 2020 and increase the state's GSP by \$802 million annually. State and local governments also would collect an additional \$177 million per year in tax revenues.

³ Nolan County: Case Study of Wind Energy Economic Impacts in Texas, July 9, 2008 (http://www.renewabletexas.org/downloads/Nolan_County_case_study_070908.pdf).

*Making a stronger commitment to renewable energy would produce results nothing short of spectacular. By raising the state's RPS to accommodate another 13,000 megawatts of power, including 3,500 megawatts in new solar photovoltaic energy, Texas' economic gains would more than triple, with job gains of up to 22,900 per year, an additional \$2.7 billion per year in GSP, and roughly \$279 million more per year in state and local taxes."*⁴

Benefits to the Local Environment

Generating energy with renewable solar, wind, and geothermal resources results in little or no direct air or water emissions.

Renewable biomass energy resources in Texas include wood wastes, agricultural waste, human and animal waste, and even invasive species such as mesquite and salt cedar. Generating facilities that utilize biomass resources produce air emissions, but new plants meet or exceed applicable emissions standards. Because these facilities utilize fuels which typically grow seasonally (or over several decades in the case of wood-based biomass from sustainably harvested forests), they do not result in net increases in anthropogenic atmospheric carbon.

Some renewable biomass technologies focus on using non-native species such as cedar and mesquite. Where these fuels are responsibly harvested, biomass energy production may aid in the restoration of water tables, promote ranch and agricultural land uses, and help improve native wildlife habitats.

Recommendations

The Texas Renewable Energy Industries Association (TREIA) supports the following initiatives related to the Senate Business & Commerce Committee's Interim Charges for the 81st legislative session.

Charge 2: *Study options for reducing demand for electricity, including innovative pricing options relating to the use of smart meters, programmable thermostats, and other demand side management and behavioral response strategies. Review current consumer education programs to reduce demand, decrease energy prices, and improve air quality. Consider benefits and costs of alternative energy sources such as geothermal and solar, and current incentives for electric and plug-in hybrid electric vehicles. The study should include recommendations on improving consumer knowledge and usage of these strategies in lowering overall electric usage, promoting energy efficiency, and improving the reliability of the ERCOT grid.*

- TREIA supports a state-wide incentive program for solar and other distributed renewable generation resources, which is tiered for residential-, commercial- and utility-scale projects.
- TREIA supports policies which ensure fair, market-based compensation for energy delivered to the grid by distributed renewable generation resources.
- TREIA supports programs which educate customers about renewable energy sources, especially those that engage flagship universities.

⁴ <http://content.news8austin.com/auscontent/HamiltonReportOnCleanEnergy.pdf>, p. 101.

- TREIA supports the use of distributed renewable generation, solar water heating, and LEED (or similar) building standards on state buildings.

Charge 3. *Study and make recommendations relating to the development and implementation of wind energy. Assess the total impact of wind energy, including additional costs to consumers, if any, buy-back provisions and pricing, the need for alternative energy sources at times when wind does not generate electricity, impact on the ERCOT grid, development of battery storage and other storage methods, and economic development impacts.*

- TREIA supports wind energy development, as well as the development of renewable energy sources that complement wind's generation profile, such as solar.
- TREIA supports the effective implementation of a non-wind renewable portfolio standard within the existing RPS to encourage the development of complementary renewable energy resources.
- TREIA supports the development of storage technology to the extent that it supports the cost-effective deployment of renewable energy resources.

Charge 4. *Study the generation costs of municipally owned electric utilities' planned generation portfolios. Consider the impact of planned generation costs on electric rates for residential and commercial customers. Solicit input on the impact of future electric rates on charitable and non-profit organizations, and the impact on such organizations' cash assistance programs to indigent customers. Consider the merits of a justifiable planned generation cost standard, and whether a deviation above the standards should be subject to approval by a vote of all customers of a municipally owned utility's service area.*

- TREIA supports studies of generation costs and rates only if those studies also consider direct and indirect or societal benefits which may accrue to the municipality, electric utility, and to the citizens of Texas.

Charge 5 *Study and make recommendations regarding career-focused education and workforce training programs in Texas to insure that such programs meet business and worker needs. Specifically, study whether such programs: meet the current and future workforce needs of health care, skilled trades, construction, manufacturing, aerospace, information technology and green jobs; help retain workers in such trades and fields; retrain and update the skills and education of workers in such trades and fields; and foster and encourage collaboration between the State, education, labor and business to provide education and training.*

- TREIA supports the Governor's Office's clean energy cluster economic development activities.
- TREIA supports coordination of the state's resources towards supporting the development of these clusters.
- TREIA supports encouraging the state's universities to make clean energy technology a priority through targeted scholarships, recruitment of students and faculty, research, and transfer of technology and training to other education and training institutions.