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Lone Star Power

How Texas Businesses Can Supply the World With Solar Energy



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Acknowledgements:

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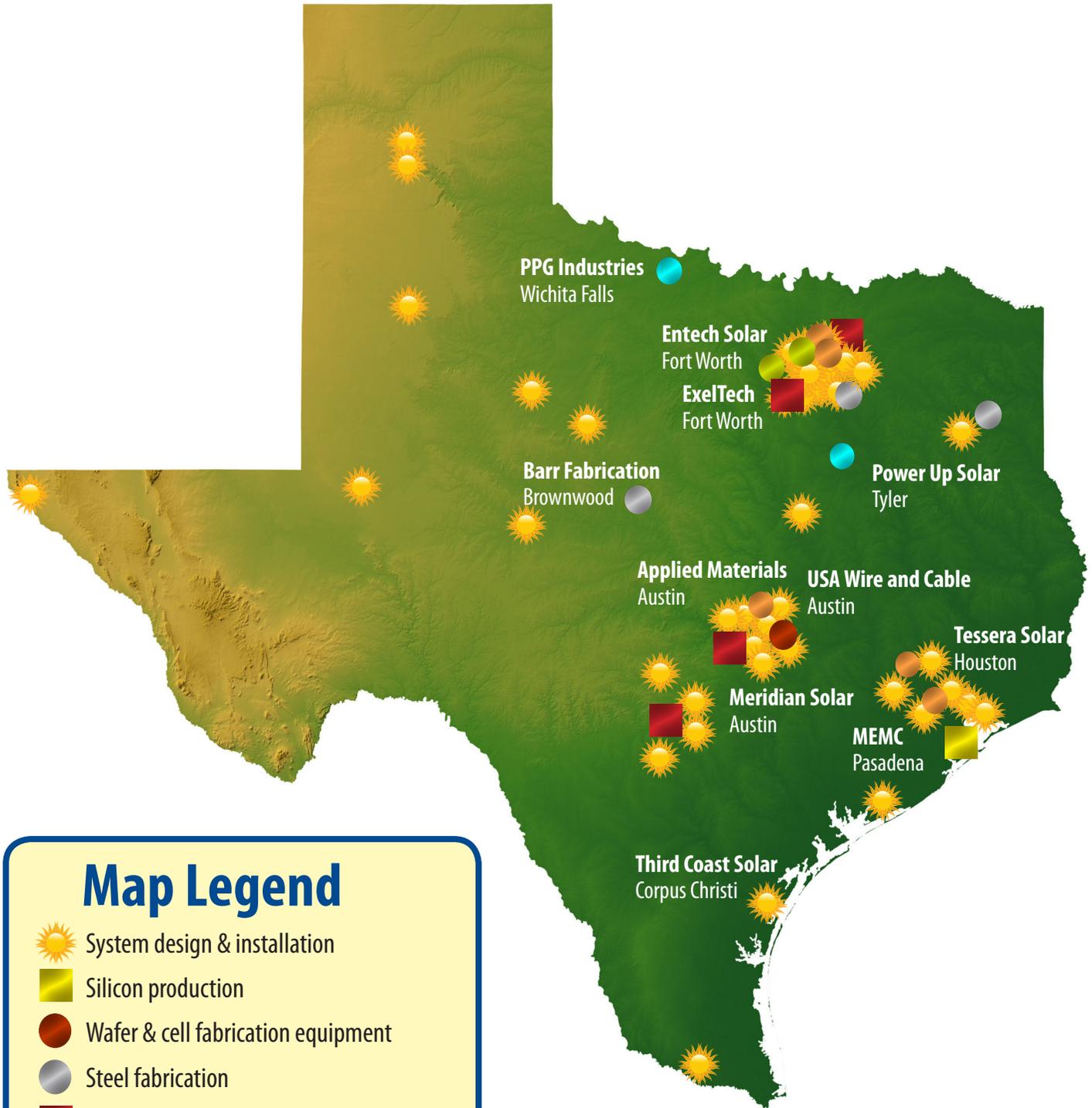
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How Texas Businesses Can Supply the World With Solar Energy



Lone Star Power

Texas companies that can supply the world with solar energy



Map Legend

-  System design & installation
-  Silicon production
-  Wafer & cell fabrication equipment
-  Steel fabrication
-  Module manufacturing
-  Inverter engineering & manufacturing
-  Glass manufacturing
-  Distribution



Executive Summary

Texas has what it takes to be a national leader in solar power. We have the most solar radiation in the country, are home to one of the world's largest suppliers of solar-grade silicon and wafers, and are innovators in the high tech industry. From a glass company in Wichita Falls, to steel brace fabrication in Brownwood, Texas-based companies span the solar supply chain.

With the solar industry quickly becoming a multi-billion-dollar venture, Texas businesses are positioned to provide the world with many of the components of solar energy systems, bringing investment dollars and high-paying jobs to the state. This white paper provides an overview of the solar supply chain, and highlights the businesses across Texas who stand to make considerable contributions to economic development and job creation in this state if we establish a robust solar market. We profile some of the companies who are either already busy producing solar components here in Texas or who could easily re-tool existing facilities to do so.

- PPG Industries is a glass manufacturer with a facility in Wichita Falls that produces glass for solar modules.
- Applied Materials, which has an Austin location, creates machinery for manufacturing solar panels.
- USA Wire and Cable is an Austin-based wire and cable distributor serving the solar industry
- MEMC's facility in Pasadena is one of the world's largest producers of polysilicon, used to create crystalline photovoltaic modules.
- ExelTech, based in Ft. Worth for over 20 years, engineers and manufactures inverters that convert electricity produced by solar power into electricity that can be used in a standard wall outlet.

- Entech Solar, also in Fort Worth, designs and manufactures proprietary solar modules.
- Barr Fabrication, in Brownwood, provided the structural support for Nevada Solar One — the largest concentrating solar plant in the world.
- Tessera Solar, headquartered in Houston, develops, owns and operates large-scale solar plants, including the Western Ranch Solar Project in West Texas under development now.

Despite our considerable presence in the solar component field, it is far from assured that Texas businesses will reap the greatest possible benefits from exponential growth in the solar industry.

Incentives provided by other states and countries are attracting major manufacturers away from Texas, leaving many of our businesses high and dry. In order to capitalize on this incredible opportunity, Texas policymakers should:

- Include solar-specific requirements in an increase of Texas' existing and highly successful Renewable Portfolio Standard.
- Establish goals and create incentives for building-integrated solar at the time of construction as part of the PUC's advanced buildings incentive program. This can be accomplished by creating a rebate program. A declining rebate should be planned over a 10-year period to give the industry confidence to invest in production, research and development. At a minimum, new buildings should be "solar-ready."
- Adopt Property Assessed Clean Energy (PACE) districts in Texas cities to provide loans to Texans to install solar panels, which are paid back through property taxes.

- Allow third-party ownership of PV systems.
- Make solar systems and installations exempt from state and local sales tax.
- Create fair buyback rates for electricity produced by solar power.
- Improve contract and interconnection standards and consumer protections for owners of solar systems, while banning homeowners' associations from denying homeowners the right to install PV panels.
- Provide for the construction of solar ties to new Competitive Renewable Energy Zone (CREZ) transmission lines in West Texas.
- Promote new ways to store the excess energy produced by the sun for later use, such as thermal storage technologies, flywheels and compressed air energy storage.
- Increase funding of research and development. Create a R&D technology center similar to the micro-computer consortium that was so successful in developing the microchip industry in Texas.

By providing incentives to help Texans put solar panels on the roofs of their homes and businesses, and by attracting companies to build large-scale solar farms, we can clean the air, create good manufacturing jobs in the solar industry and become a national leader in solar power. Thus, changes in state policy could actually help existing businesses expand while providing a likelihood that new manufacturing and power plant development companies would locate in Texas and create good, green jobs.

Introduction

According to the National Renewable Energy Laboratory, the amount of solar energy hitting the earth in 15 hours is equal to the energy represented by all of the crude oil remaining in the ground. And here in Texas we have the most to gain. According to the State Energy Conservation Office, Texas has the most solar radiation in the country. The energy from sunshine falling on a single acre of land in West Texas is capable of producing the energy equivalent of 800 barrels of oil each year.¹

Photovoltaic (PV) systems harness sunlight to create electricity. PV panels produce electricity at the times when it is needed most – on sunny days – helping to meet peak demand for electricity. PV systems can be arrayed in utility-scale power plants or distributed across the state on homes, shopping centers, parking lots and other built-up areas, providing electricity close to where it is needed. PV systems can be grid-tied, connected to utility transmission and distribution systems or used off-grid.

The Department of energy reported that solar energy electricity generation more than tripled in the US from 2000 - 2008.² Lux Research shows the US solar market growing by over 40% between 2000 and 2013, on par with global market growth. And 2010 bodes well for continued investments in solar. According to *Industrial Info*, 18% of the

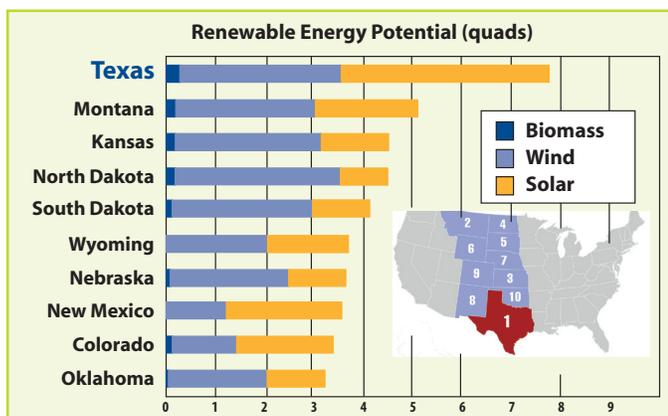
investments in potential power projects in the US and Canada will be solar, surpassing both coal and natural gas projects. The total investment value of these proposed solar projects is \$30.2 billion.³

But Texas hasn't capitalized on our natural advantages and, as a result, we are not in the top ten states for installed solar capacity.⁴ Incentive programs offered by other states are luring solar manufacturers away. Earlier this decade, solar company Powerlight (now part of SunPower) left its Round Rock headquarters to move to California. More recently, SunTech and GlobalWatt chose to build new manufacturing facilities in Arizona and Michigan respectively, in part due to the lack of a mature solar market in Texas.

Texas is not only competing with other states to become a solar leader, but with other countries. China is currently the world's largest manufacturer of solar panels and the front runner in the green world economy, boasting 1.12 million renewable energy jobs at the end of 2008. An expanded solar market in Texas can help us retain and create jobs that would otherwise go overseas.

The good news is that current Texas companies have an opportunity to create jobs in manufacturing. A report issued by the Blue Green Alliance states that if the US moved to a 25% renewable energy standard by 2025, Texas could gain over 23,000 manufacturing jobs in the photovoltaic industry alone, and some 60,000 in all renewable energy industries.⁵

One of the great advantages of building onsite and offsite solar plants are the large number of components — and subsequently the large number of jobs — they create. Thus, for every million dollars invested, the solar PV industry creates 6 jobs — 50% more than the coal industry.⁶



The solar value chain

There are multiple solar technologies and their value chain spans industries and institutions, such as manufacturing, finance, marketing, regulatory agencies, and academia. This paper focuses on the manufacture, distribution and installation of the crystalline photovoltaic solar (traditional solar) industry, but we also examine emerging technologies such as “thin-film” and large-scale concentrating solar plants.

Crystalline PV supply chain

The rooftop solar panels for which most Texans are familiar are known as crystalline photovoltaic.

The crystalline solar supply chain starts with polysilicon manufactured into wafers, which are then used to create solar cells. Solar cells are joined by wiring, laminated, and covered with iron-free glass to create a solar module. Solar modules include not only the solar cells, a protective layer of glass, and the necessary interconnection devices, but also mounting systems, wiring, and inverters to convert the electricity generated from direct current to alternating current, among other components. Solar modules and accompanying infrastructure components are sold by distributors to system designers and installers which create and maintain residential and commercial arrays.

Polysilicon

Derived from sand, polycrystalline silicon, commonly known as polysilicon, is composed of multiple small silicon crystals. Polysilicon works well in solar cells particularly because it shows great stability under an electric field and light-induced stress.

Highlight: MEMC Pasadena

MEMC, one of the largest producers of solar grade silicon, sees solar energy at the fastest growing energy technology in the world. “Granular polysilicon, which fluid bed reactors produce, is desirable since it can be easily melted to top off the crystal growing crucible, allowing a longer silicon ingot crystal without the need to shut down the furnace.”⁷ Additionally, MEMC Southwest, located in Sherman, produces polysilicon ingots which are sliced to make wafers.



Polysilicon wafers and PV cell assembly

Polysilicon wafers are thin-film silicon cells made up of polysilicon and are used in the creation of photovoltaic cells. These wafers are mere nanometers thick and are the semiconducting material necessary for solar cells. Photovoltaic cells composed from polysilicon wafers capture energy through sunlight through a phenomenon known as the photovoltaic effect. According to the State Energy Conservation Office, a thin silicon cell, four inches across, can produce about one watt of direct current electrical power in full sunlight. A few PV cells will power a hand-held calculator, while interconnected arrays can provide electricity for a remote village or serve as a power plant for a city.

Highlight: Applied Materials

Applied Materials, which has an Austin facility, is the world's largest producer of c-Si production equipment, which fabricates solar wafers and cells. Applied Materials offers a broad range of market-leading, best-in-class equipment for c-Si manufacturing. Their systems are used in manufacturing the world's most efficient commercially available solar cells, including all of the top 15 wafer manufacturers and 14 of the top 15 cell manufacturers. The systems' high productivity, advanced ultra-thin wafer handling and extensive automation can drive significant cost reductions, resulting in lower cost per watt.⁸

Solar water heaters

Energy from the sun can do more than create electricity. Indeed, proper management of solar energy can go a long way toward reducing the need for fossil fuel use. For example, buildings with light colored "cool roofs" reflect sunlight rather than absorb it, reducing the need for air conditioning use in hot climates during the summer time.

Solar energy can also reduce fossil fuel use by harnessing the sun's heat for household and commercial water heating. Solar water heaters use simple rooftop collectors to pre-heat water used for laundry, bathing and other purposes. Solar water heaters can reduce the amount of energy used for water heating in a home or business by 75 percent or more.

Public Citizen, Environment Texas, and Vote Solar, Wildcatting the Sun, February 2009.



Applied Materials: fab2farm

In addition, Applied Materials in one of several companies that offers a turn-key solution, building an entire PV solar manufacturing facility that can produce utility-scale PV power plants for a third-party or utility. These "fab2farm" manufacturing facilities have been successfully built in other countries and states, but have not been built in Texas where Applied Materials is located.

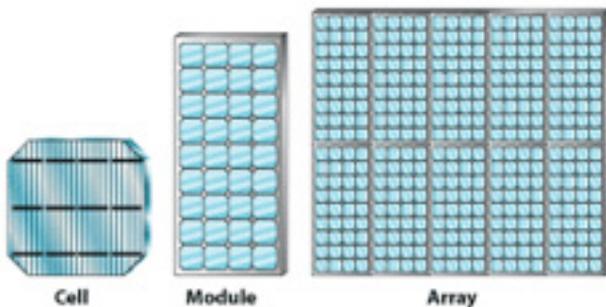
"The supply chain for manufacturing solar panels is almost all here already, we have the potential to create a generation or two of well paying jobs. If we get in on the ground floor now with solar, there is a real opportunity to make Texas the Silicon Valley of solar." said Steve Taylor, Corporate Affairs Manager for North America, Applied Materials.

PV modules

Photovoltaic modules are a packaged and interconnected array of photovoltaic cells and make up what is commonly referred to as solar panels. In addition to solar cells, and a top layer of glass, an encapsulant is used to laminate the solar cells, a rear layer protects the solar cell from the elements, and a metal frame is placed around the outer edge. There are solar module manufactures in Texas as well as companies that produce the glass used for solar panels.

Highlight - Entech Solar, Inc., Fort Worth

Entech Solar, headquartered in Fort Worth, has achieved many world records in the conversion of sunlight to electricity. It has worked with the Department of Energy, the National Renewable Energy Laboratories, NASA and the Department of Defense in building state of the art solar power systems for terrestrial and space applications. Entech Solar's ThermaVolt™ II module uses proprietary concentrating PV and thermal (CPVT) technology to convert the sun's energy into both electricity and thermal energy. The ThermaVolt has a sister technology referred to as SolarVolt that converts sunlight into electricity only. Both of these products should be commercially available in early 2011. Entech also has a unique high-efficiency tubular skylight, available commercially now.



“Incentives and mandates need to be consistent and have timelines that encourage large scale deployment of solar systems. The technology is available and continually being improved, but we need compatible, forward thinking public policy in the state of Texas to create a robust solar market,” said Bob Walters, VP of Marketing for Entech Solar.

Emerging technologies

Nanosolar and thin-film are gaining ground here in Texas and globally. Thin-film solar cells are created by a chemical vapor process, and typically use semiconductor materials such as amorphous silicon, cadmium telluride, or copper indium gallium selenide, more commonly known as CIGS. In addition to solar panels, thin-film can be used for roofing tiles and glazing. Nanosolar products are being crafted from solar inks, dyes, and conductive plastics.

HelioVolt Corporation, founded in Austin Texas in 2001, is a manufacturer of advanced thin-film Copper Indium Gallium Selenide (CIGS) photovoltaic modules.

Researchers have identified CIGS technology as a promising candidate to lower the cost of PV systems. CIGS-based devices are intrinsically stable and have high conversion efficiencies.

The CIGS alloy is a more efficient absorber of light than any other known semiconductor and requires 1/100th of the material compared to silicon for similar light absorption, replacing the single costliest component of conventional silicon PV modules.

HelioVolt deposits and processes the CIGS material on glass sheets to form continuous and uniform photovoltaic modules. The finished products are then sent to customers—solar installers, developers and building-materials companies—for installation in buildings, commercial rooftops or utility-scale systems.

Highlight - PPG Industries

PPG's glass plant in Wichita Falls is home to 2 large float glass tanks, a vacuum deposition coater, and a high-speed tempering furnace. All of these assets must be employed for most of today's high performance solar glass products. PPG Industries supplies solar module producers in North America and overseas from this plant. Glass is the material of choice in nearly all crystalline silicon (c-Si) and thin film solar modules today for all types of installations (distributed residential, commercial, and utility-scale). Therefore, the glass industry is clearly one of the primary suppliers to the solar markets in every segment and in every part of the world.

"Depending on the type of solar technology or type of modules deployed, each gigawatt of solar power can require a significant portion of a float glass tank's annual production capacity - 1/3 of a tank or more in most cases. PPG provides a key component to the solar module manufacturing process, and will be able to contribute to the economic development of the Wichita Falls area as the Texas solar market continues to grow." - Kevin Brooks of PPG Industries

Solar training programs

A number of organizations offer North American Board of Certified Energy Practitioners (NABCEP) solar certifications, including: Austin Community College, Alamo Colleges in San Antonio, Texas State Technical Colleges, the Austin Joint Apprenticeship and Training Committee for the Electrical Industry (JATC), ImagineSolar, Adven/Ontility and Solar San Antonio.

PV systems

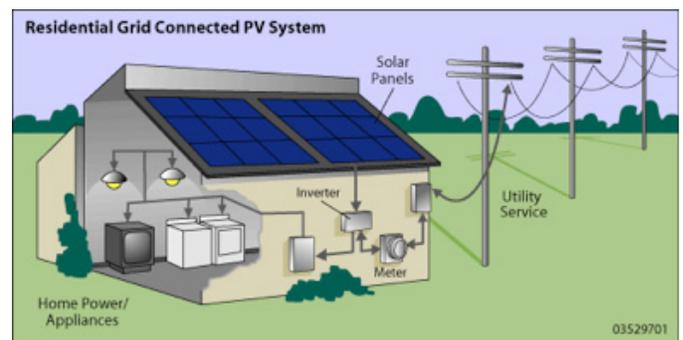
A PV system consists of solar modules, inverters, cables and wires, metal racking for mounting and an REC meter.

All of these items are available in Texas. Consumers will often use a turn key system design firm, who will also install and service the system. System designers often buy all of the system components from a distributor. Many of the components are produced and sourced right in Texas. Texas has multiple inverter engineering and manufacturing companies, a large scale wire and cable distributor, and various metal companies who provide structural components for solar systems.

Highlight: USA Wire and Cable, Austin

USA Wire and Cable is a distributor based in Austin, providing infrastructure supplies to a wide variety of power plants. USA Wire and Cable sees solar as the future and they are positioned to be one of the top US companies in the solar wire and cable space. USA Wire and Cable has completed solar projects in Texas, New Jersey, North Carolina, California, and supply residential/commercial contractors in Texas, California, Colorado, Arizona and Florida.

"With an RPS Solar mandate, cost per kilowatt will be dramatically driven down closer to parity with traditional energy sources. Just this year, costs have come down quite a bit with the limited programs that



have been in place. With aggressive growth mandates and clear long term government incentives, costs will plummet. Incentives build industry, economies of scale kick in, and the consumer gets cheaper clean energy.” - Hugh Robertson VP of Sales and Marketing for USA Wire and Cable

Highlight: ExelTech, Fort Worth

In addition to a wide array of electricity inverting products, ExelTech engineers and manufactures inverters that convert electricity from direct current to alternating current, a vital piece of the solar puzzle. ExelTech, the only TL 9000 certified inverter manufacturer in the US deals mainly in well developed solar markets, including Germany, Spain, California, and New Jersey, while competing mainly with European and Asian companies. Solar does not represent a large percentage of their current business, but as the market grows in Texas and globally, this is expected to change significantly.

ExelTech’s offices and manufacturing facility have been located in Fort Worth for 20 years, where they employ approximately 60 employees. Careers at ExelTech are varied. About one-third of their workforce is dedicated to administration and marketing, a third to manufacturing, and the rest to research and development. As the market grows, ExelTech will create new positions in manufacturing, administration and marketing to keep up.

ExelTech designs and manufactures inverters to convert direct current to alternating current. Direct current is produced from the solar panel and can be stored in a battery, this energy must be converted by an inverter to alternating current, which is the type of electricity one draws from a household wall socket. Two types of inverters are produced at ExelTech. One is a string inverter, and the other is an inverter to be placed directly on the panel. A string inverter requires

a determined number of panels to achieve voltage and wattage levels, anywhere from 10 -20 panels (avg wattage of 200 - 250, voltage of 12 or 24). ExelTech also designs and manufactures inverters for use with PV AC Modules, when the two are married together, one panel, one inverter. ExelTech sees this as the future of inverters, PV AC Modules provide scalability and affordability for consumers. Consumers can add panels as they are able to without having to invest in a 10 to 20 panel system upfront.

“Texas, already a world leader in wind generation, is a burgeoning market for solar, as other Texas utilities follow the lead of Austin’s Austin Energy and CPS Energy in San Antonio, and provide incentives and policy. Our proprietary design and manufacturing processes allow us to remain competitive with overseas ventures and we hope to create more jobs here in Texas as the market grows.” – Kevin Parsons, VP and Director of Marketing for ExelTech

Solar jobs

As the companies profiled here have demonstrated, there are a plethora of jobs in the solar industry. From solar fabrication technicians and system engineers to sales positions, manufacturing, and solar installers. Texans have a lot to gain in terms of jobs with an expanded solar market, with high-quality jobs ranging from \$15 an hour to \$100,000 a year.⁹ The solar industry holds career options for Texans who have GEDs and PhDs, spanning a great spectrum of opportunities.

Distribution of solar equipment

Distributors are a key part of the process, and having local distributors helps Texas system designers and installers to reduce transportation costs and avoid shipping Texas made products to warehouses elsewhere and then back to Texas.

Highlight: SES 21 USA, LLC

SES 21 USA, LLC is a subsidiary of the German company SES 21 AG. SES 21 USA is a national wholesale distributor of PV (solar electric) products, and chose to locate in the Dallas area, because of the extraordinary market potential in Texas. SES 21 USA provides PV products to solar installers, contractors, and integrators and expects the majority of its business to be in Texas, while also serving the South, Midwest, and Southeast regions in the U.S.

“Texas is an energy state with all the attributes to lead the nation is the installation of distributive PV generation. Barriers to PV could be resolved with better information to electric consumers,

alternative rate plans such as time-of-day metering and standardized interconnection and net-metering regulations across all utility jurisdictions. We need to empower the electric utilities. Once they are on board, PV will become a ubiquitous ancillary power source over the ensuing decades.” Chet Boortz, CEO of SES 21 USA.

System design and installation

System designers and installers are on the ground working with customers to make sure that their needs are appropriately met by solar. They design and install solar arrays, creating a finished product that pulls all of the components together. Many green jobs are created everyday in the state of Texas by these companies.

Highlight: Meridian Solar

Meridian Solar has been one of Texas’ leading solar electric design and installation firms for over a decade. With hundreds of completed projects ranging from 1 kW to two of the largest installations in Texas, Meridian Solar is one of the most experienced solar companies around. Specializing in intelligently designed commercial, government and residential installations of the highest quality, Meridian’s expert solar staff includes NABCEP® Certified Installers. Founded in 1999, Meridian Solar is a Texas-based company with offices in Austin, Dallas-Ft. Worth and San Antonio.

“Over the last ten years, the growth of Meridian Solar has largely been fueled by the growth of Texas utility rebate programs and federal incentives. While these programs have provided a boost to the Texas solar market, a statewide solar program similar to those that jump started the California and New Jersey markets would make Texas one of the premier solar states, stimulating unprecedented solar proliferation and clean energy job growth in our region,” said Andrew McCalla, CEO of Meridian Solar.



Solar applications

Solar has many different applications including distributed generation, large-scale PV arrays, and concentrating solar power plants. Each of these applications is deployed under different circumstances. It is often appropriate and possible to have on-site distributed generation where a large solar plant wouldn't suit the environment.

Distributed solar generation

Distributed generation (DG), which provides homes and businesses with electricity produced on-site, has many benefits. The farther electricity has to travel along transmission lines to reach a home or business, the greater the amount of energy that is lost along the way. By locating more energy generation closer to the places that use the energy, distributed PV reduces the energy losses inherent in transmission lines. In addition, the more DG is implemented, the less the utilities have to spend building and maintaining transmission lines. DG also has an inherent advantage over large-scale power plants in terms of reliability. As has been demonstrated numerous times during natural disasters, tornados, hurricanes and droughts frequently knock power plants offline, leaving thousands of homeowners in the dark until they are repaired. With DG, city buildings themselves become mini-power plants, reducing a city's reliance to only a few large-scale plants.¹⁰ A report commissioned by the Department of Energy's Solar America Cities Program found that rooftop solar, combined with minimal energy efficiency measures, could completely displace the use of coal in the Austin Energy service area.¹¹

Distributed solar generation is already benefiting many Texas residents and businesses, thanks to increased awareness of the technology, declining prices, and rebate programs in place. In addition to the federal investment tax credit of up to 30 percent of the cost of a home solar system, some Texas utilities are offering rebate programs. Utilities such as Austin Energy, CPS

University research facilities

University of Texas, Austin

Solar Energy Laboratory

The solar energy program at UT Austin resides in the Mechanical Engineering department. The Solar Energy Laboratory includes space and equipment for solar energy related projects and research. The recent research emphasis is on solar radiation measurements at several sites across Texas compiled as the Texas Solar Radiation Data Base. An undergraduate course is offered in solar energy systems and design.¹²

Texas Southern University

Photovoltaic Research and Demonstration Laboratory

TSU's solar activities revolve around their 4 kW PV and wind laboratory. The facility provides research projects for undergraduate and graduate students, as well as high school students participating in the University's annual summer program called the Renewable Energy and Environmental Protection (REEP) Academy.

TSU is also involved in a student exchange program with universities in South Africa and has hosted international students in their research and academic endeavors. TSU students have participated in renewable energy installations in South Africa as members of the National Renewable Energy Laboratory's PV Historically Black Colleges and Universities (HBCU) PV Research Associates Program.¹³

Energy in San Antonio, and Oncor serving North Texas, offer rebates which offer residential customers between \$2.00 and \$3.00 a watt. Commercial and industrial customers can also take advantage of various incentive programs. Solar companies installed 287 grid-tied solar systems in 2008, totaling 1.2 megawatts of capacity. Texas ended 2008 with 919 installations, for a total of 4.4 megawatts of capacity statewide. (Larry Sherwood, *Interstate Renewable Energy Council 2008 Solar Market Trends*, July 27, 2009)

Large-scale solar PV

Though there are not currently any large PV arrays operating in Texas, municipal utilities in San Antonio and Austin have signed contracts to build them.

CPS Energy, San Antonio's municipally owned utility, has a 30-year contract to buy power and related renewable-energy credits from Duke Energy, who recently purchased the 14-megawatt Blue Wing Solar Farm from Juwi Solar Inc.¹⁴ The Blue Wing Solar Farm is set to come online in 2010.

Austin Energy, Austin's municipally owned utility, has a 25-year power purchase agreement to buy power from a 30-megawatt Renewable Ventures project, located in Webberville.¹⁵ The Webberville plant is expected to come online in late 2011. The two utility-scale projects, totaling 44 megawatts, represent 1.25% of the 3,507 megawatts of large-scale PV or Thin-film PV projects under development in the United States.¹⁶

CSP

Concentrating solar power (CSP) systems use mirrors to harness the sun's heat to produce electricity. West Texas has significant potential for CSP power plant development, which, if paired with energy storage technologies, can supply consistent power from the sun, even at night.

There are 431 megawatts of Concentrating Solar Power Projects in operation in the US, however, none of these projects are in Texas. The majority of the operating projects are in California with additional installed capacity in Arizona, Nevada, and Hawaii.¹⁷ In addition to CPS Energy's 30-year agreement to buy power from a PV array with Duke, they have a 20-year agreement to purchase power from a 27-megawatt Tessera Solar concentrating solar dish-engine project in West Texas.¹⁸ This project is expected to be online in 2011. This 27-megawatt project in Texas makes up less than 0.3% of the CSP projects under development in the United States.¹⁹

Highlight: Tessera Solar

Tessera Solar is responsible for the development of the SunCatcher™ solar dish Stirling system. In addition to the project they are developing in West Texas, they have projects in California and Arizona. Tessera Solar employs business and finance leaders, project development experts, engineers, and policy experts in their North American headquarters located in Houston.

Highlight: Barr Fabrication

Barr Fabrication produced the steel support structures for the Nevada Solar One, the largest concentrating solar power plant in the world. They have been located in Brownwood since 2005, when they relocated from South Plains. Barr Fabrication manufactures components for the wind, solar, and other energy industries. 110 employees are working under the Barr umbrella, which also includes a freight company and a field services company.

Policy recommendations

The best way for Texas to ensure that the state sees a future expansion in solar power capacity and attracts manufacturers is by committing to a ten-year market development program that includes financial incentives and new construction design policies. Texans who purchase solar systems for their homes receive very little compensation for the benefits they provide to the rest of society, including reduction in peak demand and pollution. To correct this market failure, Texas electric companies should offer a variety of incentives and rebates to reduce the upfront cost of solar. With even a modest investment, we can help create economies of scale to make solar affordable for everyone and create a major economic engine for the state to boot.

The state of Texas should set a goal of developing 1000 megawatts of solar by 2015 and 5000 megawatts by 2025. As a first step, this year the Public Utility Commission should finally implement the 500 megawatt “non-wind” 2015 goal in our state renewable energy law, including a 100 megawatt program to encourage distributed renewable energy generation. We should also require retail electric providers to offer fair buyback rates for energy produced by solar and expand our energy efficiency goals with specific incentives for programs that promote onsite solar. New buildings should be “solar ready” at a minimum. Other policies that can help Texas become a leader in solar power include, allowing third party ownership of solar systems, exempting solar systems and installations from sales tax, and improving consumer protections for owners of solar. Finally, the creation of Property-Assessed Clean Energy Districts (PACE) as authorized by HB 1937 will allow municipalities to loan out money to individual homeowners and businesses to put solar on roofs among other projects. Austin, Houston, El Paso, Dallas and San Antonio are all actively exploring financial mechanisms to create local jobs and install solar. A similar statewide revolving loan program could help those areas that lack the political will or financial ability to set up their own financial districts.

Company

City

Type

SES 21 USA, LLC	Carrollton	Distribution
Kyocera Solar, Inc.	Cypress	Distribution
Sanyo Energy Corporation	Frisco	Distribution
Hisco	Houston	Distribution
Neo Eco Solutions	Pflugerville	Distribution
Guardian Industries	Corsicana	Glass Manufacturing
PPG Industries	Wichita Falls	Glass Manufacturing
ExelTech	Fort Worth	Inverter Engineering and Manufacturing
AEG Power Solutions USA, Inc.	Plano	Inverter Engineering and Manufacturing
Heliovolt	Austin	Module Manufacturing
Connexa Energy, LLC	Boerne	Module Manufacturing
Entech Solar, Inc.,	Fort Worth	Module Manufacturing
Cipher Technology	McKinney	Module Manufacturing
Barr Fabrication	Brownwood	Steel Fabrication
Trinity Renewable Energy Components	Dallas	Steel Fabrication
Cherokee Steel Fabricators	White Oak	Steel Fabrication
Applied Materials	Austin	Wafer and Cell Fabrication Equipment
MEMC Southwest	Sherman	Ingot Manufacturing
MEMC Pasadena	Pasadena	Silicon Production
Tessera Solar	Houston	Development
Miramar Energy Solutions	Addison	System Design and Installation
Earth Solar	Amarillo	System Design and Installation
Celestial Power, LLC	Austin	System Design and Installation
Clean Energy Services, LLC	Austin	System Design and Installation
Entero Energy	Austin	System Design and Installation
Equinox Power Systems, Inc.	Austin	System Design and Installation
Gridless Energies	Austin	System Design and Installation
Hill Country Ecopower	Austin	System Design and Installation
Holtek Fireplace and Solar Products	Austin	System Design and Installation
Lighthouse Solar	Austin	System Design and Installation
Longhorn Services	Austin	System Design and Installation
Meridian Solar	Austin	System Design and Installation
Simple Solar	Austin	System Design and Installation
Solar Community, LLC	Austin	System Design and Installation
Texas Solar Power Company	Austin	System Design and Installation
Henkels & McCoy, Inc.	Bedford	System Design and Installation
Solar Fanatics	Cedar Park	System Design and Installation

Company

City

Type

Third Coast Solar	Corpus Christi	System Design and Installation
Solarplex of Texas	Comfort	System Design and Installation
Solar System Installations	Coppell	System Design and Installation
Solar Power USA	Dallas	System Design and Installation
Texas Instruments, Inc.	Dallas	System Design and Installation
Gleanpower	Denton	System Design and Installation
Moore Energy, Inc.	Devine	System Design and Installation
Border Solar	El Paso	System Design and Installation
Solar Smart Living, LLC	El Paso	System Design and Installation
EcoMePlease, LLC	Fort Worth	System Design and Installation
C.A.M. Solar, Inc.	Frisco	System Design and Installation
North Texas Renewable Energy, Inc.	Ft. Worth	System Design and Installation
Maxcom Solar	Georgetown	System Design and Installation
Diez Energy Solutions	Highland Village	System Design and Installation
Alternative Power Solutions	Houston	System Design and Installation
Automatic Power-Pharos Marine	Houston	System Design and Installation
Ecowatt Design, LLC	Houston	System Design and Installation
Emerald Natural Resources Group, Spring	Houston	System Design and Installation
Heliosolar Design, Inc.	Houston	System Design and Installation
Integrated Electrical Services	Houston	System Design and Installation
ONTILITY	Houston	System Design and Installation
Pure Energy Solar Texas	Houston	System Design and Installation
Standard Renewable Energy	Houston	System Design and Installation
Therma Breeze, Inc.	Lubbock	System Design and Installation
South Texas Renewable Energy	McAllen	System Design and Installation
Home Energy Americas, LLC	McKinney	System Design and Installation
Axium Solar	Plano	System Design and Installation
Renewable Energy Enterprise, LLC	Richardson	System Design and Installation
Freedom Renewable Energy Enterprises	Rowlett	System Design and Installation
Santex Alternative Energy, Inc.	San Angelo	System Design and Installation
Hill Electric Solar Solutions	San Antonio	System Design and Installation
Smartworld Energy, Inc.	San Antonio	System Design and Installation
Emerald Natural Resources Group	Spring	System Design and Installation
Solarcraft, Inc.	Stafford	System Design and Installation
Anchiale Energy Alternatives	Sugar Land	System Design and Installation
Ameresco Solar	Tomball	System Design and Installation
Power Up Solar	Tyler	System Design and Installation

Notes

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